

THE GRASSHOPPERS AND LOCUSTS (ACRIDOIDEA) OF AUSTRALIA

VOL. III – ACRIDIDAE: SUBFAMILY
CYRTACANTHACRIDINAE

Tribes Oxyini, Spathosternini, and Praxibulini

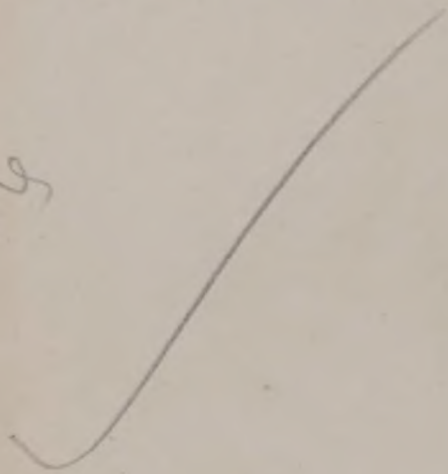
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THE GRASSHOPPERS AND LOCUSTS (ACRIDOIDEA)
OF AUSTRALIA—VOLUME III

Vol. I — Families TETRIGIDAE
and EUMASTACIDAE

Vol. II — Family ACRIDIDAE : Subfamily
PYRGOMORPHINAE

Vol. III — Family ACRIDIDAE : Subfamily
CYRTACANTHACRIDINAE
Tribes OXYINI, SPATHOSTERNINI,
and PRAXIBULINI

THE GRASSHOPPERS AND LOCUSTS (ACRIDOIDEA) OF AUSTRALIA

By

James A. G. Rehn

Curator of Insects, Academy of Natural Sciences of Philadelphia

Volume III

Family ACRIDIDAE: Subfamily CYRTACANTHACRIDINAE

Tribes OXYINI, SPATHOSTERNINI, and PRAXIBULINI

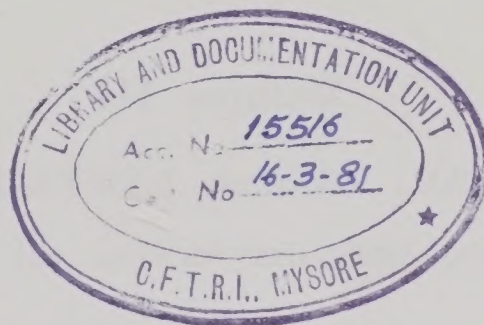


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Melbourne, October 1957

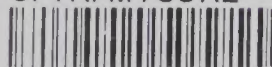


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FOREWORD

In this volume Dr. James A. G. Rehn, Curator of Insects at the Academy of Natural Sciences of Philadelphia, extends his revision of the Australian Acridoidea. General information on Dr. Rehn's approach to this study is given in the preface to Volume I of "The Grasshoppers and Locusts (Acridoidea) of Australia" (pages 11-13).

Volume I dealt with the Tetrigidae and the Eumastacidae, two of the three families of the Acridoidea represented in Australia, and Volume II dealt with the subfamily Pyrgomorphinae of the family Acrididae. The present volume deals with three tribes of the subfamily Cyrtacanthacridinae.

Most of the insect material used as the basis of this work has been drawn from the museum of the Division of Entomology, C.S.I.R.O. The greater part will be returned to that museum and to other Australian museums that have contributed material, and specimens designated as types are being returned to the institutions from which they were obtained. This means that the great majority of new types will be held in Australia and so be available to Australian entomologists working on the Acridoidea.

Family ACRIDIDAE

Subfamily CYRTACANTHACRIDINAE

The subfamily Cyrtacanthacridinae¹ is the largest single assemblage of the four generally recognized major components of the family Acrididae which occur in Australia.²

In distribution the subfamily occurs almost everywhere that members of the family may be encountered, or over an area reaching from north of the Arctic Circle south to the Straits of Magellan in the New World and Tasmania and New Zealand in the Old, in many cases at elevations as high as any where Orthoptera may be encountered, i.e. above timber-line on alpine summits. As a rule in the most extreme desert conditions we may find members of the Oedipodinae or of the Pamphaginae, and in North America a member of the Romaleinae (*Tytthotyle*), more representative, but this statement may require modification when some of the anomalous members of the Australian desert grasshopper fauna have been more fully studied. The wonderfully diverse acridid fauna of tropical rain-forests consists very largely of members of the Cyrtacanthacridinae, but while this subfamily is well represented in temperate steppe and semi-arid regions, as a whole it is not as dominant there as the Oedipodinae. In some areas in which temperate mesophytic forests predominate, as the eastern and south-eastern United States, the Cyrtacanthacridinae is strongly represented, in variety and in proportionate numbers far exceeding the other acridoid components of that fauna.

The number of genera comprising the Cyrtacanthacridinae is relatively large, and the number of known species is very great in proportion to the total for the order Orthoptera. No careful estimates of the number of genera or species have been given in recent years, and nothing would be achieved in attempting one at this time.

¹ Various other names have been used for this division, the variety of these largely being brought about by the vicissitudes to which the generic name *Acrydium* and its variant *Acridium* have been subject. With the use of this generic name now stabilized (see Roberts, Trans. Amer. Ent. Soc. 67: 13 (1941)) and completely removed from consideration in connexion with the present subfamily, two names have in recent years been used for it by various authors, i.e. Cyrtacanthacridinae and Catantopinae. The name Cyrtacanthacridinae was used by Kirby in 1910 (Syn. Cat. Orth. 2: 358), in an incorrect form (Cyrtacanthacrinae), but this term, based on a fully representative genus (*Cyrtacanthacris*) of the almost cosmopolitan "bird locusts", which assemblage includes the greater number of the classic destructive locusts, is clearly preferable in all respects to the more recently used Catantopinae, based on *Catantops*, a genus representing a subsidiary or tribal assemblage which is absent from the New World and also from the greater part of the Palaearctic region.

² Reference should be made to the key for the separation of these subfamilies given on pp. 13 and 14 of Volume II of the present monograph.

The general characters of the Cyrtacanthacridinae have already been presented.³ The members of the subfamily almost always have a prosternal process of some type,⁴ but as has been shown⁵ this possession is not peculiar to the subfamily, and the fastigium is almost never fissate, as in the Pyrgomorphinae. The external morphology shows such a wide range of development, and displays so many lines of specialization, that there is little in the way of a single feature, or convenient "ear-mark", which characterizes the subfamily other than the possession of a prosternal process combined with a non-fissate fastigium.⁶ Also the prosternal process shows a very great variety in its development, being spiuiform, dentiform, falcate, low quadrate, compressed sublamellate, even trigonal in cross section, or more rarely elevated with its distal surface deeply excavate.

It has been found desirable and more practical in this section of the monograph to reserve the full discussion of the subfamily until it has been possible to complete the generic and specific treatments of its varied Australian members, including as these do many as yet unanalysed and undescribed types. To attempt at this writing to present results which can adequately be summarized only when the detailed study of the subfamily has been completed would require unnecessary delay in making available large portions of the present study. In consequence a general summary, to be presented after the treatment of the respective tribes represented, will give a sounder and more satisfactory analysis of the whole than could now be possible. Similarly any attempt at this time to determine the most logical linear arrangement of the tribes into which the Australian members of the subfamily may be divided would be equally premature, as in few cases at this writing have these tribes been clearly defined, if defined at all, and also a number of the tribes which must be recognized would be new creations previously uncharacterized. In consequence the treatment of the Cyrtacanthacridinae in the present and following volumes of this monograph will be by tribal entities, with the analysis of each of these supra-generic aggregates as reasonably detailed as may be warranted. At the conclusion of the tribal treatments of the subfamily, with the cumulative evidence then available, will be given my concept of a logical and phylogenetic sequence of the tribes represented, and an analysis of the subfamily as represented in Australia.

³ See Vol. II, pp. 13-14.

⁴ The exceptions are in a few genera, such as the Moroccan *Anamesacris*.

⁵ See Vol. II, p. 14, footnote 9.

⁶ While members of the Pamphaginae, a non-Australian subfamily, have the same combination, members of that subfamily possess a very different type of male internal genitalia, with a most distinctive structure of the epiphallus. In regard to the male internal genitalia of the Pamphaginae as contrasted with those of the Cyrtacanthacridinae, see Roberts, Proc. Acad. Nat. Sci. Philad. 98: 212-17, 221-5, 229-32, with many relevant illustrations (1941); and comments in this monograph, Vol. II, pp. 10-11, 13-14 (1953).

Tribe OXYINI

This assemblage is entirely of Old World distribution, and chiefly Palaeotropical, although the genus *Oxya* extends more widely over peripheral areas of the Palaearctic realm, reaching as far north as Peiping and Shensi Province, China, and in Central Asia occurs in Transcaspia and Turkestan.

First definitely named by Brunner in 1893 as the group *Oxyae*,⁷ it was more comprehensively studied by I. Bolívar in 1918,⁸ who considered it a "section". Clearly tribal value should be given the assemblage, which, however, shows within itself at least several divergent lines of development. At this time it is not feasible to study critically numerous non-Australian genera which have been placed here, or assumed to belong to this complex, and until this has been done the following comments will remain as suggestions believed by me to be of constructive value.

Bolívar has summarized what he regarded as the more pertinent characters of the Oxyini, and his basic conclusions, as modified by the present study, are as follows:

Prosternal tubercle always narrow at the base, smooth or tapering or toward the apex sometimes strongly transverse ampliate, rarely bifid at apex (*Theomolpus*); genicular lobes of the caudal femora triangular with apex usually acuminate; fastigium but lightly or not at all declivent, generally horizontal or subhorizontal; frontal costa sulcate (limited in extent in *Theomolpus*); subgenital plate of male produced, conical, acuminate or subtruncate at its apex, of varying length; external extensor margin of caudal tibiae with apical spine usually present and well marked, rarely much reduced or even absent (*Theomolpus*).

It is very probable that future work, involving a greater number of genera than those here studied, will indicate that there are at least two well-marked subdivisions of the Oxyini, one of these typified by *Oxya*, the other by the Oriental and African genus *Hieroglyphus*. These two genera show markedly different developments of the epiphallus of the male. In *Oxya*⁹ the lophi¹⁰ are developed as two pairs of marked, moderately incurved, dentiform structures and the ancorae¹¹ as lateral button-like nodes; in *Hieroglyphus*¹² the lophi consist of rounded nodes from the internal side of which is developed a short recurved hook-like structure, while the ancorae are formed as transverse, dorsad recurved folds or rolls, which at their internal extremity bear a bluntly rounded

⁷ Ann. Mus. Civ. Stor. Nat. Genova 33: 136.

⁸ Trab. Mus. Nac. Cienc. Nat., Madr., Ser. Zool. No. 34: 5-43.

⁹ Ex *Oxya gavis* from Milne Bay, New Guinea, and *O. velox* from the Loo Choos.

¹⁰ See Roberts, Proc. Acad. Nat. Sci. Philad. 93: 244 (1941).

¹¹ See Roberts, Proc. Acad. Nat. Sci. Philad. 93: 241 (1941).

¹² Ex *H. banian* from Nedungadu, South India, and Toungoo, Burma.

tubercle, its surface covered with minute teeth. The genus *Gesonula*, which like *Oxya* occurs in Australia, is closer to the *Hieroglyphus* type of epiphallus, although the recurved process of the lophi is developed into a tapering whip-like structure, which extends a good part of half the proximal length of the epiphallus toward the median line and parallel to the proximal margin of the base structure, while the ancorae are flat plate-like developments extending at right angles to the general dorsal surface of the epiphallus. The genera *Hieroglyphus* and *Gesonula*, however, differ from one another in numerous quite evident structural features, and the similarity of the basic pattern of epiphallic development seems to point to an underlying relationship, on which marked external differences have been superimposed in the evolution of these genera. It would thus appear probable to me that at least two well-marked subtribes are present in the Oxyini, one centring about *Oxya*, the other similarly disposed about *Hieroglyphus*. Further discussion must await detailed study of more of the genera involved.

Considered as a whole, and as understood by I. Bolívar in 1918, the Oxyini may be said to be broadly yet locally distributed from western Africa (Senegal) south to Natal, Transvaal, and Madagascar, not occurring in Africa north of the Sudan, in Asia ranging from Transcaucasia and north-eastern China south and east to southern India, Ceylon, Burma, Siam, Indo-China, eastern and south-eastern China, Japan, Formosa, the Caroline Islands (as far east as Ponape), the Philippine and Sunda Islands, New Guinea, and the Bismarck, Solomon, and New Hebrides archipelagos, and also present in north-central and eastern Australia. A member of the genus *Oxya* is also found as an introduction in the Hawaiian Islands. In Australia, as far as present knowledge goes, members of the tribe occur in Western Australia only in its north-eastern section, in limited areas of the Northern Territory, and more broadly over Queensland and New South Wales, one form extending into the foothills of the mountains of the Australian Capital Territory, but as yet the tribe is not known from Victoria, South Australia, or Tasmania.

KEY TO THE AUSTRALIAN GENERA OF THE OXYINI

1. Caudal tibiae with margins of extensor surface distad lamellately ampliate, the extensor surface between these appreciably concave in cross section — 2
- Caudal tibiae with margins of extensor surface not lamellately ampliate, the extensor surface between not appreciably concave in cross section — 4
2. Form very slender. Fastigium narrower and more angulate. Internal series of spines on the caudal tibiae with the interval between the two distal ones equal to twice or more that between the other spines of the same series. Ovipositor valves of the female very short, deep, strongly compressed, the ventral pair encompassed laterad by the dorsal ones, margins multidenticulate *Gesonula* Uvarov
- Form not as slender, often relatively robust. Fastigium broader and blunter. Internal series of spines on the caudal tibiae with the interval between the two distal ones subequal to that between others of the same series.

Ovipositor valves of the female variously specialized, but always more elongate, the ventral pair never encompassed laterad by the dorsal ones 3

3. Fastigium of male with its length cephalad of eyes much less than fastigial breadth as seen from dorsum. Marginal field of tegmina of female not markedly inflated or bullate laterad as seen from dorsum, mediastine vein of tegmina not unusually elevated. Disto-dorsal angles of caudal femora rounded in both sexes *Oxya* Serville

Fastigium of male with its length cephalad of eyes subequal to fastigial breadth as seen from dorsum. Marginal field of tegmina of female with proximal third markedly inflated or bullate laterad as seen from dorsum, mediastine vein of tegmina unusually elevated. Disto-dorsal angles of caudal femora acutely spinose in both sexes *Bermiella* L. Bolivar

4. External margin of extensor surface with its most distal spine definitely apical in position, hence "an apical spine is present". Caudal margin of pronotal disk not emarginate. Prosternal process with apex acuminate or rounded, never concave, not produced disto-laterad. (Fully alate except in *Tolgadia*.) 5

External margin of extensor surface with its most distal spine not apical in position, hence "no apical spine is present". Caudal margin of pronotal disk markedly emarginate. Prosternal process with its distal margin concave and disto-lateral angles roundly produced. (Tegmina lobiiform.) *Theomolpus* L. Bolivar

5. Prosternal spine conical, tapering, acuminate, not compressed nor constricted at base. Antennae of male not greatly surpassing length of head and pronotum combined. Subgenital plate of male with extremity transversely truncate or triundulate. (Fully alate, mesopterous or brachypterous species.) 6

Prosternal spine not conical nor acuminate, being compressed into a more transverse structure, which is sublinguiform or constricted at its base. Antennae of male subequal to one and one-half times the combined length of the head and pronotum. Subgenital plate of male with apex briefly conic and directed dorsad. (Fully alate species.) 7

6. Tegmina and wings fully developed; marginal field of former more coriaceous proximad. Fastigium, as seen from dorsum, more trigonal in outline, more produced cephalad; fastigio-facial angle more definitely angulate. Subgenital plate of female with distal margin laterad lacking flange-like lobules. (Distal abdominal tergite of male without furcula.)

Tegmina and wings fully developed, or covering but a portion of the abdomen, or greatly reduced and lobiiform; marginal field of former of fully alate species less coriaceous and more membranous. Fastigium, as seen from dorsum, broadly rounded in general outline, less produced cephalad; fastigio-facial angle more rounded. Subgenital plate of female *Bermius* Stål

with distal margin laterad with flange-like lobules. (Distal abdominal tergite of male with or without furcula.) . *Tolgadia* Sjöstedt

7. Prosternal spine linguiform, not distinctly constricted at base, apical outline transverse arcuate. Pronotum with caudal margin of lateral lobes concave. Outline of fastigium of male, as seen from dorsum, sharper than an obtuse angle. Discoidal field of tegmina with a denser secondary venation

Bermiodes I. Bolívar

Prosternal spine distinctly constricted at base, distad subinflated. Pronotum with caudal margin of lateral lobes in greater part straight and vertical, not concave. Outline of fastigium of male, as seen from dorsum, obtuse-angulate. Discoidal field of tegmina with a more open and less complex secondary venation

Dapernia Sjöstedt

Genus GESONULA Uvarov

Gesonia Stål, 1878, Bihang K. Svenska Vetenskapsakad. Handl. 5 (4): 47; Brunner, 1893, Ann. Mus. Civ. Stor. Nat. Genova 33: 136; I. Bolívar, 1918, Trab. Mus. Nac. Cienc. Nat., Madr., Ser. Zool. No. 34: 7, 14; Sjöstedt, 1920, Ark. Zool. 12 (20): 16, 21; Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 83, 91; Willemse, 1930, Tijdschr. Ent. 73: 125; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 59, 71. (Not of Walker, 1858.)

Gesonula Uvarov, 1940, Ann. Mag. Nat. Hist. (11) 5: 174 (to replace *Gesonia* Stål, not of Walker, 1858); Rehn, 1952, Trans. Amer. Ent. Soc. 78: 117.

Genotype (by original designation) *Oxya punctifrons* Stål.

But a single species of this genus is known from Australia, where it is found only in the more northern and north-eastern parts. The nearest relationship of the genus appears to be with the much more widely distributed *Oxya*, but from that it is separable by a considerable number of characters. In general appearance and in numerous features, such as the highly specialized character of the ovipositor jaws of the female, *Gesonula* greatly resembles the Neotropical genus *Cornops*, which, however, differs very markedly in the pattern of the male genitalia, and belongs to a tribe not present in the Old World. In habits *Gesonula*, like *Cornops*, is hygrophilous, and one of its species (*G. punctifrons*) has been reported as ovipositing in the succulent stems of a species of *Colocasia* at Coimbatore, India.¹³

Generic features.—Size medium; form elongate and slender; surface of head and thorax as a whole impresso-punctate. Head with face reclinate, frontal costa sulcate throughout, margins carinate and subparallel, supplementary facial carinae well elevated, genae less punctate than face; fastigium moderately produced cephalad of eyes, with outline as seen from dorsum subacute-angulate (♂) to more bluntly and roundly rectangulate (♀), fastigial disk but weakly impressed, fastigio-facial angle as seen in profile rounded subacute-angulate; eyes prominent and subglobose in ♂, less so in ♀; antennae filiform, surpassing the head and pronotum in length. Pronotum cylindrical, widening caudad, no

¹³ Ayyar and Menon, J. Bombay Nat. Hist. Soc. 36: 517, Figs. 1-6 (1933).

lateral carinae present, median carina distinct on metazona, subobsolete to obsolete (caudad) on prozona; cephalic margin of disk arcuate with a faint median emargination, caudal margin rounded obtuse-angulate; three transverse sulci well impressed on disk, the first not evident on the lateral lobes, the second and third (principal) crossing the dorsal portion of the lobes, the latter also with a well-marked cephalic intra-marginal sulcus which is obsolete on the dorsum, the prozona of which is slightly longer than the metazona; lateral lobes of the pronotum longer than their depth caudad, cephalic margin oblique, ventro-cephalic angle obtuse, ventral margin concavely emarginate cephalad, virtually straight caudad of the median convexity, ventro-caudal angle rounded rectangulate. Tegmina elongate, narrow, linearly and subequally lanceolate in outline, their apices in both sexes much exceeding the apices of the abdomen and of the caudal femora, the tegminal apex rounded, ranging to narrowly rounded acute;¹⁴ principal longitudinal tegminal venation closely placed, areolets of distal portion narrow elongate rectangles. Wings equalling tegmina in length, costal margin rather sharply arcuate distad, the immediate apex acute. Prosternal process spiniform conical, moderately declivate; interspace between mesosternal lobes hour-glass shaped, narrower in the ♂ than in the ♀; in both sexes narrower than one of the mesosternal lobes; metasternal lobes attingent in the ♂, narrowly separated in the ♀. Male supra-anal plate trigonal or subtrigonal, with a medio-longitudinal sulcus proximad, this continued distad, or modified into a concave expansion; cerci of male simple, styliiform, tapering, the apex aciculate; subgenital plate of male very short, but slightly surpassing that of the supra-anal plate; relatively blunt, weakly compressed, its ventral surface, like that of several preceding sternites, with a distinct vesture of erect hairs; female supra-anal plate trigonal in outline, rather strongly compressed, its proximo-dorsal section deeply seated in a pronounced V-shaped emargination of the preceding tergites; female cerci simple, styliiform, tapering, falling short of the apex of the supra-anal plate; ovipositor valves markedly specialized, very short, not projecting, the dorsal ones very deep, the distal teeth strong, the dorso-external margin with an arched series (as viewed in profile) of distinct and separate teeth, dorso-internal armed at base with a few small denticles, broad dorsal (i.e. actually in repose caudad) surface proximad with a medio-longitudinal ridge which is supplied with another series of fine teeth, ventral ovipositor valves in repose resting between the distal portions of the dorsal valves, their apices with a strong hooked terminal tooth, a series of strong teeth along the ventro-external margins, while the ventro-internal ones are proximad sublamellately elevated and there supplied with a series of medium-sized teeth; lateral plates acute in outline, ventral margin of same with a close series of medium-sized teeth; female subgenital plate with its distal margin trilobate — a median trigonal intervalvar production and paired lateral rounded nodose processes. Caudal femora with carinae simple, paginal pattern regularly impressed, supra-genicular angles not produced, genicular lobes spinigerous; caudal

¹⁴ Less acute in certain non-Australian forms of the genus.

tibiae becoming moderately ampliate distad, the extensor surface there longitudinally excavate with its lateral borders lamellately elevated, external spines 8-10 in number, including the distinct apical one, all rather regularly placed, internal margin with the same range in spine numbers but with the distinct apical one and the preceding one in the series separated by an unarmed space two or more times that between the other spines, internal distal spurs approximately twice the size of the external pair; caudal tarsi relatively short, not half as long as the tibiae, the metatarsus moderately expanded and flattened dorsad, its length slightly greater than that of the third article, tarsal claws subequal in length, arolium well developed.

Distribution.—From southern (Coimbatore) and north-eastern (Assam) India eastward to eastern and south-eastern China, the Ryu Kyu Islands, Formosa, and the Philippines, south-eastward to Siam, Sumatra, Java and Borneo, the Moluccas, New Guinea, various islands of the Solomons group, and northern and north-eastern Australia.

Remarks.—The author has recently presented an analysis of the components of *Gesonula*.¹⁵ In brief the latter is made up of two species, one of which is clearly Asiatic, the other largely Indo-Malayan and Papuan but also present in Australia and on the Asiatic mainland in north Siam. This last-mentioned species breaks up into five reasonably well-marked geographic races, of which one is Australian.¹⁶

GESONULA MUNDATA (Walker)

This species is divisible into five subspecies, of which but the nominate one is Australian. The author recently presented an analysis of these subspecies, to which paper the student is referred for further information on the non-Australian elements.¹⁷

In distribution the species *mundata* ranges from elevated north Siam (Chieng Mai region) across Indo-Malaya to the Moluccas, the Philippines, New Guinea, northern and north-eastern Australia, and the Solomons. The typical subspecies (i.e. *mundata mundata*) occurs only in Australia, although *m. sanguinolenta* of New Guinea, the Moluccas, the Talaut group, and the Solomons is more nearly related to the Australian form than is any other.

GESONULA MUNDATA MUNDATA (Walker)

Plate 1, Figs. 1 and 2; Plate 7, Figs. 56-59

Heteracris mundata Walker, 1870, Cat. Spec. Derm. Salt. Brit. Mus. 4: 672 (♂; Port Essington [N. Northern Territory]).

Gesononia recticercus Sjöstedt, 1920, Ark. Zool. 12 (20): 21 (♂, ♀; Cape York Peninsula, Queensland); Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 92, Plate 3.

¹⁵ Trans. Amer. Ent. Soc. 78: 117-36 (1952).

¹⁶ In the author's study of *Gesonula*, here referred to, will be found a considerable amount of data on, and discussion of, the various non-Australian representatives of the genus. Variational data drawn from the same units are also summarized.

¹⁷ "On the genus *Gesonula* (Orthoptera: Acrididae: Cytacanthacridinae)." Trans. Amer. Ent. Soc. 78: 117-36 (1952).

Figs. 7, 7a, and 8 (Cape York Peninsula, Gayndah, and Rockhampton, Queensland); Sjöstedt, 1930, Ark. Zool. 21A (21): 2 (Groote Eylandt, Northern Territory); Sjöstedt, 1932, Ark. Zool. 23A (11): 3 (Brisbane, Queensland); Sjöstedt, 1933, Ark. Zool. 26A (9): 2 (Brock's [in error Brook] Creek, Northern Territory).

Gesonia mundata Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. 15 (2): 71 (Port Essington, Groote Eylandt, and Brock's Creek, Northern Territory; Cape York Peninsula; Townsville, Gayndah, Rockhampton, and Brisbane, Queensland); Sjöstedt, 1942, Ark. Zool. 33B (16): 6 (Pine Mountain).^{17a}

Gesonula mundata mundata Rehn, 1952, Trans. Amer. Ent. Soc. 78: 126. (Combination.)

Northern Territory.—Melville Island;¹⁸ (W. D. Dodd) 1 ♀ (Academy of Natural Sciences of Philadelphia). Darwin; (G. F. Hill) 1 ♀ (South Australian Museum). Brock's Creek, Burnside; 5. ii. 1932 (T. G. Campbell) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra);¹⁹ 27. iii. 1936 (T. G. Campbell) 1 ♀, 1 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Roper River;²⁰ (N. B. Tindale) 1 ♀ (South Australian Museum).

Queensland.—2 miles NW. of Cairns; 7.xi.1945 (A. N. Johnston and C. R. Emery) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). Rockhampton; 1 ♀ (Museum of Comparative Zoology); (A. M. Lea); 1 ♂ (South Australian Museum). Ayr; 12.x.1950 (E. F. Riek) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 10 miles SW. of Ayr; 5. x. 1950 (E. F. Riek) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 45 miles SW. of Ayr; 9.x.1950 (E. F. Riek) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra).

Of the 12 adults before me five, i.e. the male from 2 miles NW. of Cairns, the three from the Ayr district, and the Brock's Creek male, have their coloration largely or entirely unaltered, while in the other adults the base tone, in part at least, is somewhat changed by wet preservative or desiccation. Of the adults with their coloration but little or not at all altered, the male from 2 miles NW. of Cairns has the pale base colour of the face, genae, lateral lobes of the pronotum, pleura, and of the sides of the abdomen chamois (of Ridgway), while the caudal femora are dull wax-yellow, with the dorsal pale area of the fastigium, occiput, pronotal disk, and anal field of the tegmina javel green. The individuals from the Ayr district are more decidedly green, the face, genae, and lateral lobes of the pronotum calliste green (of Ridgway), somewhat duller on the pleura, while the dorsal surface ranges from scheele's green (of Ridgway) to peacock green, the caudal femora from oil yellow (Ridgway) to javel green. The Brock's Creek female has the pale areas less decidedly green and more yellowish, the face, genae, lateral lobes of the pronotum, and pleura chalcedony yellow, the caudal femora dull amber yellow, the pale dorsal areas clear dull green-yellow (of Ridgway) to lumiere green. The caudal tibiae are glaucous in all specimens in which

^{17a} I have been unable to locate Sjöstedt's Pine Mountain locality.

¹⁸ Off coast of Northern Territory north of Darwin, and due west of Cobourg Peninsula.

¹⁹ This specimen is one of those reported from this locality by Sjöstedt in 1933 as *Gesonia recticercus*, and is so labelled by him.

²⁰ Entering Gulf of Carpentaria from west in southern section of Arnhem Land.

the base coloration is undisturbed, very weakly infusate distad,²¹ and with the proximal extremity well marked with carmine, this being indicated even in those with the base coloration altered.

The number of dark antennal bands apparently varies as greatly in this form as in other members of this genus, as has already been discussed at some length by the author.²²

The adult specimens of *m. munda* which are in sufficiently good shape to measure show the following dimensions:

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂, 2 miles NW. of Cairns, Queensland	20.2	4.4	21.5	11.9
♂, Ayr, Queensland	17.6	4.0	21.3	11.4
♀, Melville Island, N.T.	19.5	4.1	21.8	12.2
♀, Brock's Creek, Burnside, N.T.	22.1	4.7	23.3	12.2
♀, Roper River, N.T.	20.8	4.7	23.7	12.3
♀, 10 miles SW. of Ayr, Queensland	22.3	5.2	24.1	13.2
♀, 45 miles SW. of Ayr, Queensland	22.0	4.9	24.9	13.3
♀, Rockhampton, Queensland	22.3	5.0	23.6	13.0

Distribution.—Northern section of the Northern Territory, inland at least as far as Brock's Creek and Roper River, Groote Eylandt in the Gulf of Carpentaria, Cape York Peninsula, and more coastal areas of Queensland south as far as Brisbane. The occurrence of this hygrophilous species is probably much localized, as its ecological requirements necessitate the presence of wet areas with tall grass, taro, or other moisture-loving vegetation.

Genus OXYA Serville

Oxya Serville, 1831, Ann. Sci. Nat. 22: 264, 286; Brunner, 1893, Ann. Mus. Civ. Stor. Nat. Genova 33: 136; I. Bolívar, 1918, Trab. Mus. Nac. Cienc. Nat., Madr., Ser. Zool. No. 34: 7, 14; Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 83, 92; Willemse, 1925, Tijdschr. Ent. 68: 1-60; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 59, 71.

Genotype (by monotypy) *Oxya hyla* Serville.²³

²¹ This is almost lacking in the Ayr male and the Melville Island female.

²² Trans. Amer. Ent. Soc. 78: 119-20 (1952).

²³ I fully agree with Kirby (Syn. Cat. Orth. 3: 393 (1910)), I. Bolívar (Trab. Mus. Nac. Cienc. Nat., Madr., Ser. Zool. No. 34: 15 (1918)), and Uvarov (Bull. Ent. Res. 17 (1): 47 (1926)) regarding the propriety of using *hyla* as the first name for the widely spread African species of *Oxya*. Regardless of the fact that Serville referred in 1831 to both Africa and Java as the habitat for this species, and his species was in consequence composite, Senegal stood first in his listing of localities, and his subsequent 1839 reference to *hyla* (Hist. Nat. Ins., Orth.: 678, Plate 12, Fig. 4) states definitely "la femelle figurée [the sole figure given] est du Senegal". Willemse's (1925) use of Walker's *viridivitta* for this West African species was unfortunate, as the fact that *hyla* was originally composite does not invalidate its use for the common African species, as has been well pointed out by Uvarov in 1926. At the present time I have before me an extensive representation of *hyla* from numerous localities in Africa.

But a single species of this Palaeotropical and Asiatic genus is known from Australia, occurring only in a narrow area of eastern Queensland and north-eastern New South Wales. The genus comprises some 34 species, with its present centre of maximum differentiation in southern and eastern Asia, India and Pakistan presenting the greatest diversity of forms.

Of the various Australian genera of the Oxyini *Oxya* is nearest to *Bermiella* and *Gesonula*. There is a marked general similarity of the various species of *Oxya* to those of the endemic Australian oxyinid genus *Bermius*, but the latter lacks the lamellately elevated lateral margins of the extensor surface of the caudal tibiae, which are so well marked in *Oxya*, and also in *Gesonula*.

Generic features.—Body moderately elongate, fully alate or with tegmina and wings not surpassing the middle of the abdomen; body surface more or less appreciably supplied with scattered hairs. Head with occiput rounded, face moderately retreating; fastigium broad trigonal, as seen from dorsum broader than long in both sexes, apex rounded and blunt, its disk at most but shallowly excavate, no lateral foveolae present; frontal costa moderately broad, evenly sulcate from fastigio-facial angle to supra-clypeal suture; lateral facial carinae well developed, reaching to supra-clypeal suture, nearly straight; eyes moderately prominent, in basal outline subelliptical to ovoid; antennae filiform, in length ranging in the male from hardly equal to, to one and one-half times as long as, the head and pronotum together, in the female proportionately shorter. Pronotum with three transverse sulci well marked on the disk, the principal (more caudal) one placed slightly caudad of the middle of the pronotum, on the lateral lobes the first (cephalad) dorsal sulcus is obsolete but is replaced by a well-marked cephalic intra-marginal one; median carina of disk well but not strongly marked on the metazona, of variable emphasis on the prozona but never as evident as on the metazona and of less uniform character, no lateral discal carinae present, but metazona less broadly rounding into the lateral lobes than is the case with the prozona; cephalic margin of disk subtruncate or arcuate, caudal margin subsinuately obtuse-angulate with the apex blunted, or arcuate; lateral lobes of pronotum longer than deep, ventro-cephalic angle subangularly arcuate. Tegmina with mediastine field appreciably widened proximad in the female, but weakly so in the male; costal margin more or less distinctly but finely serrulate;²⁴ intercalary field with few, if any, cross-veins. Wings with axillary veins proximad with spaced serrulations.²⁵ Prosternal spine but little inclined, cylindro-conic, apex acuminate and not broadened, the whole not touching the mesosternum; metasternal lobes usually attingent, in some species subattingent in female. Caudal femora with medio-dorsal carina smooth, its distal extremity blunt or with a small tooth, distal dorso-lateral angles of

²⁴ This is a variable factor in different species of this genus.

²⁵ Willemse (Tijdschr. Ent. 68: 9 (1925)) refers to this condition as ciliate, i.e. "Axillaradern der Hinterflügel an der Basis bewinpert". These structures in species examined are much more rigid and chitinous than cilia and are quite regularly spaced, more akin in character to what is known to be present on the same veins in a number of stridulating oedipodid grasshoppers.

caudal femora rounded, genicular lobes apically spiniform; caudal tibiae with distal section of extensor margin broadening distad and subconcave, extensor lateral margins there lamellately developed, forming a pronounced rim bearing the marginal spines, latter regularly placed, apical one present on both margins, external series, exclusive of apical, usually 7 in number, internal 9-10; metatarsus of caudal tarsi moderately expanded laterad; arolia present; tarsal claws subequal in length. Distal abdominal segments, particularly in males, much more heavily haired than remainder of abdomen; ovipositor valves of usual elongate acridoid type, margins of valves denticulate.

Distribution.—The genus *Oxya* has two major areas of distribution, separated by territory in south-western Asia not favourable for its presence, although doubtless its distribution was continuous in the not distant past. In Africa it occurs from Senegal and the Anglo-Egyptian Sudan southward to the Transvaal and Natal, as well as in Madagascar. It also has been recorded from Mauritius, but I feel that its presence there has been due to human agencies. In Asia it is broadly distributed, reaching as far westward as Russian Turkestan (Usbek and Turkmen S.S.R.) and north-western and western India; north to Turkestan, northern China, Manchuria, the Siberian Maritime Province, and Hokkaido (Yezo), Japan, and south and south-eastward over India to Ceylon, across Burma and Indo-China to Indonesia, Formosa, the Philippines, New Guinea, south-eastern Australia, the Solomons, and the New Hebrides, finally reaching as far as Ponape in the eastern Caroline Islands. A single Asiatic species has been introduced in Hawaii. There can be little question but that *Oxya* is a relatively recent arrival in Australia.

A number of the extra-limital species of the genus are of considerable economic importance, some being destructive in rice-growing districts.

Remarks.—The single Australian species of *Oxya* (*gavisa*) can be identified readily from the generic key and the preceding generic diagnosis, with further aid, if necessary, from the accompanying figures of that species.

OXYA GAVISA (Walker)

Plate 1, Figs. 3-6; Plate 7, Figs. 60-63

Heteracris gavisa Walker, Cat. Derm. Salt. Brit. Mus. 4: 669 [♂; Ceram].

Oxya velox Froggatt, 1904 (not *velox* of Fabricius, 1787, nor of present authors), Agric. Gaz. N.S.W., Misc. Publ. No. 720: 4, pl. Fig. 3 [Clarence and Richmond Rivers [New South Wales]]; Sjöstedt, 1920, Ark. Zool. 12 (20): 22 [Bellenden Ker, Queensland]; Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 92 [Bellenden Ker, Queensland, and New South Wales (latter on basis of Froggatt's records)]; Sjöstedt, 1931, Ark. Zool. 23A (11): 3 [Brisbane and Stradbroke Island, Queensland].

Oxya sinensis Willemse, 1925 (not *sinensis* of Walker, 1870, nor of present authors), Tijdschr. Ent. 68: 13, 19 [N. Queensland]; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 71 [in addition to above-cited records for *velox*, Blackall Range, Queensland]; Sjöstedt, 1942, Ark. Zool. 33B (16): 6 [Gordonvale, N. Queensland].

Oxya gavisa Kirby, 1910, Syn. Cat. Orth. 3: 395 (first use of combination from the evidence of Walker's type); Willemse, 1925, Tijdschr. Ent. 68: 13, 47, Figs. 52 and 53 [Ceram, Obi, Amboina, Buru, New Guinea, Key Islands, Aru Islands, Dammer, New Hebrides, Solomon Islands, and Java (latter then queried as to correctness of locality)].

Queensland.—Cairns; 3 ♂ (South Australian Museum and Academy of Natural Sciences of Philadelphia). 2 miles NW. of Cairns; 11.vii.1915 (A. N. Johnston and C. R. Emery) 3 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Etty Bay, NW. of Innisfail; 8.viii.1947 (L. G. Webb) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). Malanda; 12.ii.1944 (K. R. Norris) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra).

It is now possible to assign correctly material of the sole species of the genus *Oxya* occurring in Australia. Much of the earlier confusion in this genus was due to misidentifications of the first names proposed for species now known to belong to *Oxya*, such as *velox* of Fabricius, described from China, and *hyla* of Serville, from Senegal. Later, apparently on the basis of male material, Willemse, in the first study of the genus which was at all comprehensive,²⁶ recorded *sinensis* of Walker (= *chinensis* (Thunberg)) from northern Queensland. Males of *Oxya* are more difficult to determine than females, on the basis of our present knowledge; in fact Willemse's key is based solely on females, but it is now evident that Australian individuals of *Oxya* represent *gavisa* (Walker), and not *sinensis* of that author (= *chinensis* Thunberg). These conclusions are drawn not only from Willemse's study, but also from comparison with individuals of both sexes which were received in exchange from the British Museum (Natural History) and had been determined by Willemse after comparison with Walker's type in that institution. These specimens are one male from Damma [= Dammar] Island, and one female from Wokan Dobbo, Aru Islands, taken September 1874 by the Challenger Expedition. The distinctive characters of the subgenital plate of the females of both *gavisa* and *sinensis*²⁷ (= *chinensis* (Thunberg)) are clearly presented by Willemse's outline figures.

Of the two Australian females before me that from Malanda virtually lacks any spiniform production on the ventro-lateral section of the second abdominal tergite, although possessing these on the third and fourth, while the female from 2 miles NW. of Cairns has such processes evident on all three tergites, as is the more usual condition in females of this species.

The few Australian males before me show an appreciable degree of variation in the emphasis of the development of two terminal points on the cerci. In one from 2 miles NW. of Cairns the more dorsal of these is virtually obsolete, while several from Cairns show it quite evident, but essentially the same range of variation is seen in a series of 21 males from British New Guinea now before me,²⁸ which represent what Willemse described subsequent to his revision as

²⁶ "Revision der Gattung *Oxya* Serville (Orthoptera, Subfam. Acridoidea, trib. Cyrtacanthacinae". Tijdschr. Ent. 68: 1-60 (1925).

²⁷ There is before me in the Academy series a considerable representation of *chinensis* (= *sinensis* as used by Willemse) from a number of localities, none of these, however, being in the Australian region or its general neighbourhood.

²⁸ Hihilai Plantation, Milne Bay, New Guinea; 18-28.ii.1944, 2-25.iii.1944, 8 and 14.iv.1944 (E. R. Helwig) 17 ♂, 10 ♀ [Academy of Natural Sciences of Philadelphia]. K.B. Mission, Milne Bay, New Guinea; 14.ii.1944 (E. R. Helwig) 7 ♂ [Academy of Natural Sciences of Philadelphia].

Oxya gavis subspecies *aurantiaca*,²⁹ but which, as discussed beyond, I feel has no validity. The supra-anal plate of the male varies in the sharpness of the angulation of its outline distad, ranging from the more rounded type figured by Willemse for *gavis*,³⁰ to that with a more acute apex, as here shown from the Etty Bay individual. The three males from Cairns exhibit the extremes, while the three from 2 miles NW. of Cairns show intermediate conditions between the extremes, and this plasticity is exhibited by the much more extensive male representation of what Willemse called *O. g. aurantiaca*, from Milne Bay, New Guinea.

In size *Oxya gavis* varies very markedly in both sexes, and in the same locality. The measurements which have been given for the species by Willemse³¹ equal but a portion of the size range seen in the series now before me. The following table graphically presents the size fluctuation in the limited Australian series before me, and in representative individuals or size extremes in other available series of *gavis*.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂, 2 miles NW. of Cairns, Queensland	21.0	5.0	17.4	14.0
♂, 2 miles NW. of Cairns, Queensland	19.1	4.4	14.3	12.8
♂, 2 miles NW. of Cairns, Queensland	18.3 ³²	4.5	14.8	13.0
♂, Etty Bay, Queensland	21.0 ³²	4.8	15.6	13.8
♂, Bougainville, Solomons	24.2	5.7	20.3	15.8
♂, Malaita, Solomons	23.9	6.0	22.1	16.4
♂, Florida Island, Solomons	23.0	5.2	20.2	14.8
♂, K. B. Mission, Milne Bay, New Guinea	20.3 ³²	5.3	17.2	15.3
♂, Hihilai Plantation, Milne Bay, New Guinea	25.2	6.0	20.5	17.6
♀, 2 miles NW. of Cairns, Queensland	24.0	6.1	18.1	17.2
♀, Malanda, Queensland	27.0	7.0	23.4	18.0
♀, Bougainville, Solomons	33.5	8.3	26.0	22.3
♀, Malaita, Solomons	27.0	7.0	25.2	18.4
♀, Malaita, Solomons	33.0	7.6	28.5	21.3
♀, Hihilai Plantation, Milne Bay, New Guinea	30.3	7.5	23.9	20.8
♀, Hihilai Plantation, Milne Bay, New Guinea	34.7	8.4	28.1	23.6

The considerable range in size to be found in both sexes in a limited area is evident from these figures, particularly notable in the case of the representation

²⁹ Ent. Ber., Amst. 9: 179 (1935).

³⁰ Tijdschr. Ent. 68: 48, Text-Fig. 53 (1925).

³¹ Tijdschr. Ent. 68: 49 (1925).

³² Apex of abdomen more recurved dorsad than usual, hence body length is somewhat shortened.

from Milne Bay, New Guinea, but well indicated by the limited Australian one. It is probable, however, that Australian material averages smaller than that from New Guinea or the Solomons.

The paired yellow dorsal post-ocular lineations found in the male sex are well evident in two of those from 2 miles NW. of Cairns, obsolete in one from the same locality, and weakly marked in that from Etty Bay, while two of the Cairns males have them well marked, the third with them obsolete. All of the males from the Solomons have them well marked, occasionally as light as pale buff. They are similarly, or even more pronounced in the Milne Bay, New Guinea, series, but here the colour is always definitely yellow. Some of the females in this latter series also show narrow and weak indications of these same lineations.

All of the Milne Bay individuals differ from the others of the series before me in having the caudal femora, except for the genicular extremity, entirely or at least with the distal half strongly marked with flame scarlet (of Ridgway), much as in *Gesonula mundata sanguinolenta* from the same locality, and also from other areas where the latter subspecies occurs.³³ There is no indication of this type of coloration in any of the other material of the species before me, but it has been referred to by Ramme³⁴ as frequently seen in *O. gavis*, probably also on the basis of New Guinea material, but no definite statement is made by him on the latter point. The coloration of these New Guinea individuals appears to have been the basic reason for Willemse's creating his *Oxya gavis* subspecies *aurantiaca*.³⁵ The material before me gives no support to Willemse's claim that his subspecies has a "somewhat more pointed prosternal spine, somewhat longer elytra, the well developed spine on the third tergite" [presumably of the female but not so stated]. The prosternal spine is identical in the Milne Bay and Solomons material with what is seen in the other females of the species before me; the measurements here given show that they do not have proportionately longer tegmina, and as my preceding remarks show, there is variation in Australian material in the female tergal spination. All of the New Guinea and Solomons specimens before me have glaucous tibiae of varying depth. Willemse's comments on tibial coloration are mystifyingly contradictory, i.e. "hind tibiae in the male of a beautiful orange, in the female more greenish yellow-orange, while in the type [!] the hind tibiae are greenish blue". From the evidence before me I can only regard *aurantiaca* as inseparable from true *gavis*.

In addition to material mentioned above specifically I have also seen *gavis* from the Soela Islands, east of Celebes.³⁶ The species is definitely known to range from at least as far west as Soela (here reported), Buru and Dammar (Willemse

³³ See Rehn, Trans. Amer. Ent. Soc. 78: 128 (1952).

³⁴ Mitt. Zool. Mus. Berlin 25 (1): 214 (1941).

³⁵ Ent. Ber., Amst. 9: 179 (1935). [δ , η ; Mamberamo, Meervlakte, Motorbivak, Van Rees Geb., Pioneerbivak, Prauwenbivak, Kaimana, and Hollandia, New Guinea.] Both sexes are referred to, but no type or type locality is indicated, although "Type Mus. Buitenzorg" is appended. No measurements are given.

³⁶ Soela Islands; 22. v. 1914 1 δ , 1 η [Academy of Natural Sciences of Philadelphia].

1925) Islands, eastward over the Moluccas, Key and Aru Islands, New Guinea, north-eastern Australia, and the Solomons to New Hebrides (specifically Espirito Santo Island⁴⁷), and north-eastward to the Palau group of the Carolines.³⁸ Willense in his 1925 study cited certain Javanese material of this species, but queried the exactness of the locality. In Australia the distribution of *gavisa* is limited to a narrow belt along a portion of the eastern coast, the known records extending from the vicinity of Cairns and Bellenden Ker southward along the Queensland coastal area to the Brisbane district (i.e. Brisbane, Stradbroke Island, and the Blackall Range), while in New South Wales it is known only from the vicinity of the Clarence and Richmond Rivers in the extreme north-eastern part of the State. It is evident, from its distribution, that the species is one of the more recent arrivals from New Guinea.

Genus *BERMIELLA* I. Bolivar

Bermiella I. Bolívar, 1912, Trab. Mus. Cienc. Nat., Madr., No. 6: 50; I. Bolívar, 1918, Trab. Mus. Cienc. Nat., Madr., Ser. Zool. No. 34: 10, 27; Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 84, 92; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 59, 71.

Macroquitta Carl, 1916, Rev. Suisse Zool. 24: 469.

Genotype (by original designation) *Bermius acutus* Stål.

This genus is an Australian endemic, containing but a single species. In general it has more affinity with *Oxya* than with *Bermius*, like the former possessing distinctly lamellate lateral margins to the caudal tibiae. However, *Bermiella* has several distinctive and peculiar features, such as the spiniform, instead of rounded, dorso-lateral distal angles of the caudal femora, which are found in both sexes, and in the female sex a most unusual expansion and bullation of the marginal field of the tegmina, together with the presence of a brush-like pilosity in the neighbourhood of the tegminal anal vein.

Generic features.—Body moderately elongate, fully alate in both sexes; body surface but sparsely haired if at all, except as here specifically noted. Head with occiput moderately rounded, face moderately retreating, more strongly so in the male than in the female; fastigium but moderately produced, trigonal, in the male subequal in breadth and length, in the female distinctly broader than long, apex rounded, disk shallowly excavate; no lateral foveolae; frontal costa well marked and sulcate, becoming subobsolete near supra-clypeal suture, margins subparallel and rounded in section; lateral facial carinae distinctly subsinuate, diverging ventrad, well arcuate caudad of antennal insertions; lateral ocelli placed close to eyes; eyes but moderately evident from dorsum, ovoid in basal outline; antennae simple, not at all (♀) or but little longer than the head and pronotum (♂) combined. Pronotum sellate, but not excavately so, slightly (♀) or markedly (♂) longer than greatest breadth caudad across lateral lobes, in

⁴⁷ Willense, Trans. Ent. Soc. Lond. 1925: 527 (1926).

³⁸ Willense, Eos, Madr., tomo extraord.: 345 (1950).

cross section the prozona more evenly rounded than the metazona, the latter with its disk more deplanate and with rounded lateral shoulders, no lateral carinae present, lateral lobes, as seen from dorsum with their caudo-lateral angles slightly (σ) or much more decidedly (φ) sublamellately extended laterad; cephalic margin of pronotal disk arcuato-truncate to shallowly sinuate mesad, caudal margin of same arcuate, with or without a slight median emargination;³⁹ three transverse sulci distinctly but lightly impressed, the prozona occupying one-half (φ) to five-sevenths (σ) of the total pronotal length; lateral lobes with cephalic intra-marginal sulcus and sulci two and three quite deeply impressed except on ventral section of lobes, ventral border of lateral lobes cingulate (or girdled), this sublamellately produced caudad in the female, the angle there rounded produced in both sexes, the outline of the margin as seen in profile sinuate with an evident median sublobation. Tegmina and wings surpassing the apex of the abdomen by a distance subequal to the pronotal length; tegmina in male simple, with marginal field not at all expanded or specialized in structure, in the female the marginal field has the proximal two-fifths arcuately and lobately expanded in outline and bullately inflated as seen from the dorsum, the mediastine vein costate and markedly elevated, very short supra-coxal costal nervures with their upper surface microscopically spiculate, area of the anai vein of the tegmina of the female often with a longitudinally disposed brush-like development of closely set pile.⁴⁰ Prosternal spine slender, conical, acute. Mesosternal lobes very narrowly (σ) or somewhat more decidedly (φ) separated; metasternal lobes subcontiguous (σ) or moderately separated (φ). Cephalic and median limbs relatively short, the femora not (φ) or but moderately (σ) inflated. Caudal femora with distal supra-genicular margin with a median acute spine and larger and broader lateral subspiniform points at the usually rounded angles, genicular lobes acutely produced at their apices; caudal tibiae with the extensor lateral margins moderately yet sharply lamellate elevated in their distal halves, these appreciably ciliate between the spines, external apical spine present, external spine series (with apical) 8-9, internal 9-10. Male subgenital plate strongly produced distad, conical, apex aciculate; male cerci simple, tapering, lightly decurving distad; ovipositor valves of female relatively stout, short, hooked distad, dorso-external margin of dorsal valves and ventral margin of lateral plates serrulate; subgenital plate of female with its ventral surface longitudinally impressed mesad, its distal margin triangularly produced caudad between converging elevated marginally serrate and apically dentate lateral bounding lamellate ridges; surface of extreme distal abdominal sternites in both sexes distinctly pilose.

Distribution.—For the single known species, in northern and eastern coastal Australia from Derby, W.A., around to New South Wales in the general neighbourhood of Sydney.

³⁹ This latter condition, on the basis of the material now before me, is a purely individual character.

⁴⁰ The presence or absence of this is discussed more in detail in the specific treatment.

BERMIELLA ACUTA (Stål)

Plate 1, Figs. 7 and 8; Plate 2, Figs. 13 and 14; Plate 7, Figs. 64-66

B[ermius] acutus Stål, 1878, Bihaug K. Svenska Vetenskapsakad. Handl. 5 (4): 93 [♂, ♀; Gayndah [, Queensland]; Cape York [, Queensland]].⁴¹

Bermiella acuta L. Bolívar, 1918, Trab. Mus. Nac. Cienc. Nat. Madr., Ser. Zool. No. 34: 27 [N. Australia]; Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 92, Plate 3, Figs. 9 and 10 ["Australia;"] Gayndah, Cape York, and Rockhampton, Queensland; Darwin, Northern Territory]; Sjöstedt, 1931, Ark. Zool. 23A (11): 3 [Brisbane district, Queensland]; Sjöstedt, 1932, Ark. Zool. 23A (19): 2 [Narrabeen[, New South Wales]]; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 71, 72 [localities previously cited by him plus Wyndham, Western Australia].

Macroquilla longipennis Carl, 1916, Rev. Suisse Zool. 24: 470, Plate 2, Figs. 1 and 2 [♀; Rockhampton [, Queensland]].

Bermiella ampla Sjöstedt, 1920, Ark. Zool. 12 (20): 26 [♀; Kimberley district, north-west Australia]; Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 93, Plate 3, Figs. 11 and 11a [more extensive description but no additional localities]; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 71, 72 [no additional information].

Western Australia.—Derby; (W. D. Dodd) 1 ♀ (South Australian Museum). Kimberley Research Station, 3 miles NE. of Ivanhoe; 1949-50 (E. C. B. Langfield) 1 ♂, 4 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia).

Northern Territory.—Darwin; (W. L. Hunt) 1 ♂ (South Australian Museum); (G. F. Hill) 1 ♀ (Academy of Natural Sciences of Philadelphia). Brock's Creek; 27.iii.1936 (T. G. Campbell) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra).

Queensland.—Normanton; (R. Kemp) 1 ♂ (South Australian Museum).

New South Wales.—Narrabeen; Jan. 1926 (M. Fuller) 1 ♀ [Division of Entomology Museum, C.S.I.R.O., Canberra].⁴²

There can be no question but that Sjöstedt's *ampla* was based on a recessively coloured individual of Stål's *acuta*. Nothing given in the original description of *ampla* has any possible diagnostic value except the almost complete effacement of the usual dark post-ocular bars. In his 1935 key Sjöstedt uses only this feature to distinguish *ampla* from *acuta*. In the small series now before me from Kimberley Research Station the range in pattern emphasis in its four females shows conclusively that the supposed difference is purely an individual condition. In one female the dark post-ocular bar is sharply defined on the head and pronotum, in a second it is less sharply defined dorsad on the pronotum, in another it is well marked only along the usual ventral border, and in the fourth

⁴¹ Stål gives both localities in this order, with the further note that the Gayndah material is the property of the Stockholm Museum, that from Cape York, of the Brunner Collection [now in the Vienna Museum]. Nowhere is information given on the sex or sexes represented by either locality. Sjöstedt is similarly obscure as to what he considered *the* type, even in his list of types in the Stockholm Museum, although in 1921 he states the Stockholm Museum had "2 ♂, 1 ♀" from Gayndah. I would here designate one of the former figured in 1921 by Sjöstedt as the single type (lectotype) of the species.

⁴² This specimen forms the basis of Sjöstedt's 1932 record of the species from this locality. It bears Sjöstedt's long-hand identification label.

it is indicated only by a short medio-ventral cloud on the pronotum and is much less evident on the head than in the others. The Normanton, Derby, and Kimberley Research Station males have the bars well marked, but in the last-mentioned they are weakened dorsad; the female from Brock's Creek has the bars evident but not solid or uniform, the pale base colour showing through, particularly on the metazona, while the Narrabeen female has the bars well marked. Sjöstedt had, it should be noted, also recorded both "species" from the Kimberley district of Western Australia, which would indicate that he also found a lack of stability in the supposed colour differences in material from that section.

The synonymy of *Macroquilta longipennis* Carl was established in 1921 by Sjöstedt from an examination of Carl's type.

This species, and genus, is in some respects the most striking of the Australian Oxyini. This is chiefly evident in the female sex, where the unusual bullation of the proximal section of the marginal field, particularly when the closed tegmina are viewed from the dorsum, is most distinctive and characteristic. In the male sex there is no complementary expansion or bullation of the marginal field. It is quite possible that this development has some relation to stridulating functions, and perhaps it is a condition which permits better sound reception by the underlying tympana. The costal margin of the tegmina in the male sex shows no evident serrulations, nor does the mediastine vein, which similarly is neither elevated nor thickened in that sex. In the female, however, a number of short cross-veins in the more costal section of the supra-coxal part of the marginal field are spiculately denticulate. Whether there is counterplay with the well-spaced, shallowly imbricate, chevron-shaped impressions of the internal surface of the caudal femora remains to be determined. There do not appear to be any rasp-like structures on these low ridges, but the latter conceivably may be concerned with stridulation. If it should be found that stridulation in this genus is a function of the female sex alone, that fact would be noteworthy.

Females of this species show a considerable range in the exact degree of development of the bullation of the marginal field of the tegmina as viewed from the dorsum, together with the exact degree of progressive expansion of the pronotum caudad across the lateral lobes. The Derby female, that from Darwin, and two of the Kimberley Station females have this expansion most pronounced, another from the last-mentioned locality has it somewhat less marked, and the fourth from the same point, as well as those from Brock's Creek and Narrabeen, have this tendency less evident than in the others. I have endeavoured to make clear these conditions in the measurements given below. The male sex, however, is markedly more slender than the least bullate of the females. As the table here appended shows, the two females with the most pronounced tegminal bullation and the more markedly expanding pronotum are appreciably larger than the other individuals.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Pronotum	Greatest Breadth of Pronotum across Lateral Lobes Caudad	Length of Tegmen	Marginal Breadth across Closed Tegmina at Dilated Marginal Section	Length of Caudal Femur
♂, Kimberley Research Station, W.A.	35.0	7.9	5.7	32.6	5.3	19.5
♂, Darwin, N.T.	35.0	7.8	6.1	29.3	5.7	19.0
♂, Normanton, Queensland ⁴³	28.0	6.1	5.0	25.0	4.4	16.3
♀, Derby, W.A.	31.0	8.8	8.4	33.0	8.9	21.5
♀, Kimberley Research Station, W.A.	46.0	10.7	10.2	45.6	11.6	27.7
♀, Kimberley Research Station, W.A.	40.0	10.5	10.7	44.2	10.5	27.3
♀, Kimberley Research Station, W.A.	40.5	9.1	8.4	41.5	9.2	25.7
♀, Kimberley Research Station, W.A.	37.5	8.4	7.9	36.3	8.6	24.4
♀, Darwin, N.T.	36.5	8.6	8.4	32.8	8.8	24.0
♀, Brock's Creek, N.T.	33.3	7.9	7.3	34.0	6.1	23.9
♀, Narrabeen, N.S.W.	37.0	8.1	8.3	36.0	— ⁴⁴	24.2

Apparently correlated with the degree of pronotal expansion and bullation of the marginal field is the strength of the pilosity which may be present in the vicinity of the proximal section of the anal vein of the tegmina in the female sex. This is but weakly indicated in the females from Brock's Creek and Narrabeen, almost absent in one of the more slender Kimberley Station females, and more evident but still sparse in the other of this type, while in the two larger and more expanded females from the same locality this longitudinally disposed development is relatively dense and brushlike. In no case does it reach to the tegminal base, a proximal area almost equal in length to the breadth of the metazonal disk being without pile, which also is not evident distad of the proximal two-fifths of the tegminal length. The male sex entirely lacks any indication of this condition.

In base colour tone the male is slightly more brownish grey than the Kimberley Station and Brock's Creek females, which in general are light lumiere green to turtle green (of Ridgway) on the head, pronotum, tegmina, pleura, and cephalic and median limbs, aside from the darker post-ocular bars, where they are marked, the darkening of the proximal section of the costal border, and the infuscation of the longitudinal veins of the discoidal field of the tegmina. The

⁴³ This specimen has been dried from alcohol and is appreciably shrivelled, hence its smaller size may not be fully comparable.

⁴⁴ As this specimen has both wings spread this measurement cannot be determined with any accuracy.

Narrabeen female, however, is definitely brownish in its base tone, but whether some of this, i.e. on head, pronotum, remainder of thorax, and abdomen, is due to discoloration, it is difficult to say. The caudal femora in the specimens before me range from water green and chamois to olive-ochre in their base tone, except where blackened by desiccation, while the caudal tibiae are tones of glaucous unless similarly discoloured.

Our present knowledge of the distribution of this species indicates its occurrence in areas on or adjacent to the coast from the King Sound region of north-eastern Western Australia (Derby, Wyndham, and Kimberley Research Station) across the Northern Territory (Darwin and Brock's Creek), about the Gulf of Carpentaria (Normanton), to northern and eastern Queensland (Cape York, Rockhampton, Gayndah, and the Brisbane district), and eastern New South Wales (Narrabeen).

Genus *BERMIUS* Stål

Bermius Stål, 1878, Bihang K. Svenska Vetenskapsakad. Handl. 5 (4): 48, 91; Brunner, 1893, Ann. Mus. Civ. Stor. Nat. Genova 33: 136; I. Bolívar, 1912, Trab. Mus. Nac. Cienc. Nat., Madr., Ser. Zool. No. 6: 50; I. Bolívar, 1918, Trab. Mus. Nac. Cienc. Nat., Madr., Ser. Zool. No. 34: 10, 27; Sjöstedt, 1920, Ark. Zool. 12 (20): 16, 23; Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 84, 93; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 60, 72.

Genotype (by selection of Kirby 1910)⁴⁵ *Bermius brachycerus* Stål.

The genus *Bermius* is the most widely distributed and representative of the endemic Australian elements of the Oxyini. Over much of Australia it seems to take the place occupied in Indonesia and south-eastern Asia by the genus *Oxya*. However, *Bermius* and the other genera of the Oxyini apparently are absent from a very considerable part of Australia, this comprising the greater part (south and central) of Western Australia, and all of South Australia, Victoria, and Tasmania, while there is but little information on their occurrence over most of the Northern Territory. Nine species have been described as members of the genus *Bermius*, of which one (*queenlandicus*) has already been synonymized by Sjöstedt, its describer. Of the remainder, two (*stål*i and *cylindricus*, both of Sjöstedt) are here synonymized, while *cairnsensis* Sjöstedt, *bivittatus* Sjöstedt, and *infirmus* Stål are now removed to the related genus *Tolgadia*.

There are two sections of the genus, one containing *odontocercus* Stål and *curvicerus* Sjöstedt, the other comprising *brachycerus* Stål, which breaks into three geographic subspecies, and a well-distinct new species, *buntamura*. The first-mentioned section more nearly approaches *Bermiella* than the other one, of which the species *buntamura* is placed last as it more nearly approaches the genus *Tolgadia*, which I regard as following *Bermius* in a linear arrangement.

Generic features.—Body moderately elongate, fully alate, general form closely resembling that of *Oxya*; body surface, as in latter genus, more or less appreciably supplied with scattered hairs, these usually most evident, when

⁴⁵ Syn. Cat. Orth. 3: 396.

present, on the tegmina and on certain distal abdominal sternites. Head in general resembling that of *Oxya*; fastigium but moderately produced, in outline as seen from dorsum ranging from moderately acute to rectangulate in the male, from rectangulate to obtuse-angulate in the female, its disk at most but shallowly excavate, no lateral foveolae present; frontal costa sulcate from fastigio-facial angle to supra-clypeal suture; lateral facial carinae well developed; eyes moderately prominent, in basal outline subelliptical to ovoid; antennae filiform, in length in the female hardly surpassing the combined length of the head and pronotum, in the male somewhat longer. Pronotum essentially as in *Oxya*, occasionally subsellate, with three distinct but lightly impressed transverse sulci on the disk, the principal (more caudal) one placed slightly caudad of the middle of the pronotum, lateral lobes with their sulci as in *Oxya*; median carina of disk distinctly but not strongly indicated on the metazona, weak to obsolete on most or all of the prozona, no lateral discal carinae present⁴⁶ but low lateral shoulders more evident on the metazona than on the prozona; cephalic margin of disk subtruncate to very weak arcuate, caudal margin arcuate to subobtuse angulate with the apex blunted; lateral lobes much as in *Oxya*. Tegmina with the proximal arcuate widening of the mediastine field in the female as evident as in *Oxya*, this almost obsolete in the male; in the male sex the short rami of the mediastine vein may or may not be supplied with minute spiniform nodulose points;⁴⁷ intercalary field proximad with a densely anastomosed neuration, this becoming more open distad with a more or less evident median false intercalary vein; female with the vicinity of the anal vein and adjacent section of the discoidal field occasionally supplied with a thin covering of pile, never as dense as in *Bermiella* but often relatively evident. Wings in repose reaching to the apices of the tegmina. Prosternal spine somewhat inclined, cylindro-conic with the apex variably acuminate and not broadened distad, not touching the mesosternum; mesosternal lobes subattingent to narrowly separated. Caudal femora with medio-dorsal carina smooth, their distal extremity with a distinct blunt tooth or with the same obsolete, distal dorso-lateral angles of caudal femora rounded, genicular lobes acute to rectangulate at their extremity, but not spinigerous; caudal tibiae with lateral extensor margins carinulate, but not at all lamellate, distad, marginal spines relatively regular in placement, apical one present on both margins, external spines, exclusive of apical, usually numbering eight and internal nine; metatarsus of caudal tarsi moderately expanded laterad; arolia present; tarsal claws subequal in length. Cerci of male elongate, slender, simple, or with internal accessory tooth in distal half; subgenital plate of male moderately produced mesad into a structure which is transverse truncate, concave or trituberculate⁴⁸ distad.

⁴⁶ In specimens of *B. brachycerus* surface texture differs on the opposite sides of this position, giving an impression of the presence of weak carinulae, but this is hardly more than a change in secondary surface sculpture.

⁴⁷ As in *Oxya* the development of such structures appears to be a specific matter, and even relatively variable in degree in the same entity.

⁴⁸ i.e. with a median projection and paired lateral angulations to the margin.

Ovipositor valves of female of usual moderately elongate acridoid type, margins of valves entire to irregularly microserulate; distal margin of subgenital plate of female without lateral flange-like lobations.

Discussion.—In *Bermius* there are well-marked green and brown colour phases indicated; also in brown phase individuals there is a range in tonal depth which further modifies the general appearance. In one extreme of this depth range the disk of the pronotum and the dorsum of the head is clay colour, while in the other these areas may be as dark as pecan brown, occasionally as rufescent as cacao brown. With this intensification, and especially in *brachycerus* and its subspecies, are correlated an increasing strength and extent of infuscation of the flexor surface of the caudal tibiae, from one extreme with but the faintest intimation along the external flexor carina, to the opposite one in which the whole of the flexor surface of these tibiae is infusate, as dark sometimes as bistre. The purely individual character of this range completely escaped the attention of Sjöstedt, who insisted on endeavouring to use it in his keys as a basis for specific differentiation. The examination of series of these same species from a number of localities makes clear what is represented, i.e. one aspect of a general individual intensification of tonal depth. Sjöstedt also attempted to use relatively minor differences in tegminal length as the sole key feature to separate females of three supposedly different species, one of these known from but a single female. The material now available shows that while average size is of value as aiding in the determination of material, individual size alone can be misleading. Females of *brachycerus brachycerus* before me range in body length from 30.0 to 36.5 mm, and in tegminal length at a single locality from 24.4 to 29.0; *curvicercus* in body length from 29 to 40 at a single locality, and in tegminal length in the same area from 24.4 to 33.0; *buntamurra* at the same locality in body length from 30.5 to 40, and in tegminal length from 21.8 to 30.4. To repeat, average size is of value as an accessory feature in the recognition of some of the forms, but is untrustworthy when dealing with single specimens.

Distribution.—From the Kimberley district of north-eastern Western Australia across the northern section of the Northern Territory to eastern Queensland, and southward across coastal and interior New South Wales and the Australian Capital Territory, as far south as the Lachlan River area of the Darling plains, the mountains of the Australian Capital Territory, and the coastal district as far south as Nelligen. In Queensland the coastal form (*B. b. brachycerus*) extends inland as far as Peak Downs, while in interior and extreme south-western Queensland a quite distinct species (*buntamurra*) is known to occur. There is a single record in the literature of *B. brachycerus* from Hermannsburg in the Macdonnell Ranges of southern Northern Territory, but I have seen no material from that area and no undoubted *brachycerus* is before me from any locality west of eastern Queensland. This record is probably of a *Bermius*, although conceivably it could be based on a long-winged species of *Tolgadia*. The species of *Bermius* now known from localities nearest to Hermannsburg, yet hundreds of miles away, are *curvicercus* of the northern part of Northern Territory and *buntamurra* of interior Queensland.

KEY TO SPECIES AND SUBSPECIES OF *BERMIUS*

1. Cerci of male armed on the internal surface before the apex with an accessory tooth or process. Supra-anal plate of male with medio-longitudinal sulcation hardly or not reaching distad of the middle of the plate. Disk of prozona of pronotum in both sexes as a whole much less distinctly or closely cribose impresso-punctate than that of metazona; caudal margin of pronotal disk in both sexes subangulate . 2
 Cerci of male slender, tapering, simple. Supra-anal plate of male with medio-longitudinal sulcation sometimes interrupted at mid length but otherwise virtually reaching to the apex of the plate. Disk of prozona of pronotum in both sexes as a whole but slightly, if at all, less cribose impresso-punctate than that of the metazona; caudal margin of pronotal disk in both sexes arcuate to subarcuate. (Marginal field of tegmina of female but weakly lobate proximad, little more so than in male; subgenital plate of female lacking a distinct medio-longitudinal impression in distal half of its ventral surface) 3
2. Male cerci falcately inbowed in distal half, their immediate apices directed ventro-caudad, the internal accessory process, which is briefly pre-apical, forming with the cercal apex an obliquely truncate expansion of the internal surface. Male subgenital plate with its median production relatively broad, its distal breadth not less than half the proximal width of the plate. (Marginal field of tegmina of female strongly lobate in proximal section; subgenital plate of female with a distinct medio-longitudinal impression in distal half.) (Northern part of Northern Territory and Kimberley district of Western Australia.)
curvicercus Sjöstedt
- Male cerci weakly incurving over their whole length, the internal tooth placed at one-third the cercal length from the apex, and not forming an expansion with the latter. Male subgenital plate with its median production relatively narrow, its distal breadth equal to not more than one-third of the proximal width of the plate. (Eastern coastal Queensland and northern coastal New South Wales.)
odontocercus Stål
3. Body in both sexes stouter and broader, head particularly so. Fastigio-facial angle as seen in profile not sharper than rectangulate in both sexes. Face less strongly retreating in both sexes. Cerci of male more strongly decurving distad; supra-anal plate of male with a series of four sub-parallel, elevated, strongly developed, longitudinal rugae in proximal two-fifths. (Size relatively large. Outline of lastigium of male, as seen from dorsum, obtuse-angulate.) (Central and south-western Queensland.)
buntamurra n. sp.
- Body in both sexes more slender, head proportionately narrower. Fastigio-facial angle as seen in profile slightly to appreciably acute-angulate in both sexes. Face more strongly retreating in both sexes. Cerci of male less strongly decurving distad; supra-anal plate of male with not more

than two subparallel elevated longitudinal rugae in proximal two-fifths
4

4. Size averaging larger (length of body, ♂, 27.1 (25.5-28.5) mm, ♀, 35.8 (35.0-37.0)). Fastigium of male slightly more produced and acute-angulate in outline as seen from dorsum. Frontal costa of female somewhat more shallowly sulcate. (Eyes in females less prominent as seen from dorsum.) (Australian Capital Territory.) *brachycerus magistralis* n. subsp.

Size averaging smaller (length of body, ♂, 23.6 (21.0-26.3) mm, ♀, 32.4 (29.5-36.5)). Fastigium of male less produced and subrectangulate to obtuse-angulate in outline as seen from the dorsum. Frontal costa of female somewhat more deeply sulcate 5

5. Form as a whole more slender. Fastigial angle as seen from dorsum averaging slightly sharper in both sexes, subrectangulate in the male; fastigium as a whole averaging more produced; interocular space proportionately somewhat narrower. (Darling plains and adjacent slopes in interior Queensland and New South Wales.)

brachycerus planicola n. subsp.

Form as a whole less slender. Fastigial angle as seen from dorsum averaging slightly broader and obtuse-angulate in both sexes; fastigium as a whole averaging slightly less produced; interocular space proportionately somewhat broader. (East coast of Queensland and New South Wales.)

brachycerus brachycerus Stål

BERMIUS ODONTOCERCUS Stål

Plate 1, Fig. 9; Plate 2, Fig. 15; Plate 7, Figs. 67 and 68

B[ermius] odontocercus Stål, 1878, Bihang K. Svenska Vetenskapsakad. Handl. 5 (4): 92 (♂ [here selected as lectotype], ♀; "Australia borealis" = Port Curtis, Queensland); I. Bolívar, 1918, Trab. Mus. Nac. Cienc. Nat., Madr., Ser. Zool. No. 34: 27 (N[orth] Australia); Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 94, 96, Plate 3, Figs. 16, 17, and 17a (♂, ♀; Port Curtis, (type material re-examined) and Cedar Creek, Queensland; Tweed River, New South Wales); Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 72, 73, 74 (additional locality, Federal Cap[ital] Territory [= Australian Capital Territory], but not Wyndham [W. A.]⁴⁹); Sjöstedt, 1941, Ark. Zool. 33B: 6 (Pine Mountain, presumably Queensland,⁵⁰ and Wide Bay, Queensland)⁵¹.

Bermius queenslandicus Sjöstedt, 1920, Ark. Zool. 12 (20): 24, 25 (♂, Cedar Creek [Queensland]).

Queensland.—Malanda; 16.ii.1944 (K. R. Norris) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). Gayndah;⁵² (A. M. Lea) 1 ♂, 1 ♀ (South Australian Museum).

⁴⁹ The latter relates to *Tolgadia bivittata*, which see.

⁵⁰ I have been unable to locate Sjöstedt's "Pine Mountain" locality.

⁵¹ Wide Bay is on the coast immediately S. of the south end of Great Sandy Island, the latter E. of Maryborough. Approximate position, 25° 52' S., 113° 7' E.

⁵² About 60 miles W. of Maryborough, on the Burnett River. Elevation, about 450 ft.

New South Wales.—Middle Pkt (= Packet);⁵³ 12.i.1929 (Chadwick) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra).

The species *queenslandicus*, based on two males in the Stockholm Museum, was synonymized by its author without comment under *odontocercus* a year after it was described.⁵⁴ The original material of *odontocercus* belonged to the Brunner Collection according to Stål, and it was so regarded by Sjöstedt in 1921, yet the species is included in the latter's catalogue of Orthoptera types in the Stockholm Museum.⁵⁵ However, in view of Stål's original statement and Sjöstedt's 1921 acknowledgment, one of the males described in detail by Stål from Port Curtis (the exact locality of the "Australia borealis" material), now in the Vienna Museum, is here selected as the lectotype. Whether the male figured by Sjöstedt in 1921 as *odontocercus* is this male, the second male from the original lot, or one of the other three males from Cedar Creek, Queensland, or Tweed River, New South Wales, then listed, we have no way of determining from the literature.

The very distinctive genitalic features of the male sex of *odontocercus* should serve to place it without difficulty. Its relationship is much nearer to *B. curvicerus* than to *brachycerus*, but males of the three species are readily distinguishable by the features given in the key.

The subgenital plates of the three males now before me differ somewhat in the proportionate breadth of the median production, this being somewhat narrower in those from Malanda and Gayndah, but these are probably merely individual conditions.

The males in hand have the post-ocular bars well marked, although in their prozonal sections of the same they have a translucence dorsad which makes them less solid than on the metazona. The principal longitudinal tegminal veins are very appreciably infuscate, and the anal field of the tegmina is paler in base colour than the marginal and discoidal fields of the same. The antennal colour pattern is much as in *curvicerus*.

The males before me differ but slightly in size, although two are from the extremes of the species's range. They measure as follows:

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Pronotum	Greatest Caudal Breadth of Pronotal Disk	Length of Tegmen	Length of Caudal Femur
♂, Malanda, Queensland	32.0	6.6	3.5	26.0	17.6
♂, Gayndah, Queensland	30.0	7.0	4.0	24.3	18.5
♂, Middle Packet, N.S.W.	32.0	7.0	3.7	27.2	19.3
♀, Gayndah, Queensland	35.0 ⁵⁶	8.4	5.3	31.9	21.0

⁵³ Four miles from Billinudgel, 13 miles NNW. of Byron Bay. (Information from Dr. Key.)

⁵⁴ Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 96 (1921).

⁵⁵ Ark. Zool. 24A (1): 49 (1932).

⁵⁶ Abdomen contracted.

Distribution.—The range of this species appears to be largely, and perhaps entirely, on or near the east coast of Queensland and north-eastern New South Wales. Definite records extend from Malanda, on the Atherton Tableland of northern Queensland, south to the extreme north-eastern section of New South Wales. I very much question Sjöstedt's record of *odontocercus* from the Capital Territory, as the considerable representation of the genus now before me from that area is solely of *brachycerus magistralis*, and one of these specimens bears Sjöstedt's long-hand determination as *odontocercus*. This specimen, however, bears a different date from that given his 1935 *odontocercus* record from that Territory. Under *brachycerus* this situation is discussed more fully. Another locality given in 1935 by Sjöstedt for *odontocercus*, and before that in 1932 for the same species, i.e. Wyndham, W.A., is completely erroneous in determination, as the material so reported is now before me, and proves to be his *bivittatus*, which I find is a member of the genus *Tolgadia*.

BERMIUS CURVICERCUS Sjöstedt

Plate 1, Figs. 10-12; Plate 2, Fig. 16; Plate 7, Figs. 69-73

Bermius odontocercus Sjöstedt, 1920 (not *Bermius odontocercus* Stål, 1878), Ark. Zool. 12 (20): 24, 25 (♂, ♀; Kimberley district, north-western Australia).

Bermius curvicercus Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 94, 97, Plate 3, Fig. 18 (♂, ♀; Kimberley district, north-western Australia; Darwin, Northern Territory); Sjöstedt, 1931, Ark. Zool. 22A (7): 2 (Brock Creek [Brock's Creek], Burnside, Northern Territory); Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 72, 73, 74 (no additional information).

Western Australia.—Ivanhoe Station, Kimberley district; 26.i.1948 (L. J. Phillips) 1 ♀, 1 juv. ♀; (Division of Entomology Museum, C.S.I.R.O., Canberra): 1 ♀ (Museum of Western Australia). Kimberley Research Station, 3 miles NE. of Ivanhoe, Kimberley district; 1949-50, Jan. and Feb. 1950 (B. F. Rudeforth and E. C. B. Langfield): 5 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Fitzroy and Margaret Rivers; 1896 (Calvert Expedition) 1 ♀ (South Australian Museum).

Northern Territory.—Groote Eylandt; (N. B. Tindale) 1 ♂ (South Australian Museum). Darwin; 23.iii.1936 (T. G. Campbell) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra): 11.ii.1945 (B. Malkin) 2 ♂ (United States National Museum and Academy of Natural Sciences of Philadelphia). Adelaide River, 70 miles S. of Darwin; 25.iii.1945 (B. Malkin) 1 ♀ (United States National Museum). Brock's Creek; 29.iii.1929⁵⁷ and 2.iv.1936 (T. G. Campbell) 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Katherine; 23-27.iv.1917 (A. Stewart) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra).

The material on which this species was originally based is in the Stockholm Museum, and the figured male is here selected as the lectotype.

⁵⁷ This specimen is the basis of Sjöstedt's 1931 record of the species from "Brock Creek, Burnside", and bears Sjöstedt's long-hand determination label.

With *B. odontocercus* of coastal Queensland and New South Wales this species forms a natural section of the genus well distinct from the genotype *B. brachycercus*. The preceding key to the species of *Berminus* presents the more salient features distinguishing the two sections. The accompanying figures make these specific differences fully evident.

As is frequently the case in members of the Oxyini this species shows considerable individual colour and size variation. The former, as far as pattern is concerned, is usually a reflection of the strength and solidity of the darker elements, of which the post-ocular bars are the most striking. These on the head and pronotum may be of uniform depth, or dorsad, and particularly on the lateral lobes of the pronotum, they may become subobsolete and there imperfectly defined. The two extremes are found in females in the Kimberley Station series. There is also some individual variation in the extent to which the longitudinal tegminal veins of the marginal and discoidal fields are pencilled with fuscous. From an extreme in which the mediastine, discoidal, humeral, median, ulnar, and anal veins are definitely so pencilled, there is a range to an opposite extreme in which but the ulnar and anal veins are pencilled, and then chiefly proximad. The emphasis on vein pencilling is not necessarily coupled with the solidity of the post-ocular bar, although the greatest reduction of the pencilling (i.e. restricted to the ulnar and anal veins) is found in the Ivanhoe female, which has the lightest green base colouring.⁵⁸ The antennae are variegated with fuscous, apparently in correlation with the strength of the dark post-ocular bar. In paler individuals the fuscous is present only on the ventral surface of the proximal articles, while distad its coloration alternates segmentally. In the darker specimens the paler antennal areas are virtually orange and the fuscous areas are deeper and more decided than in the other individuals.

The brown and green phases are chiefly distinguished by a more isabelline tone to the pale areas of the dorsum in the former, and the more greenish shade of the same sections in the green phase, except that the single Ivanhoe female is more vividly citron green on the face, genae, jaws, ventral portion of the lateral lobes of the pronotum, pleura, abdomen, and limbs (except the caudal tibiae and tarsi) than any other specimen seen.

Individual variation in the breadth of the pronotum as compared with greatest discal breadth is well exemplified in the Kimberley Station series, the extremes there seen in this respect being marked, as the measurements given below testify. While the Ivanhoe Station female is of the broader pronotal type, and is also relatively small, the more slender pronotal types are usually smaller individuals. The exact angle of the fastigium, as seen from the dorsum, varies individually, as does the exact depth of impression of the fastigial disk. The former is equally evident in both sexes, but the latter is more so in the female.

⁵⁸ It is possible that this specimen may be somewhat teneral, but there is no clear evidence of this. The female from the Fitzroy and Margaret Rivers has been dried from alcohol, is somewhat decolorate, and shows distortion of certain structures.

Representative individuals of both sexes measure as follows:

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Pronotum	Greatest Caudal Breadth of Pronotal Disk	Length of Tegmen	Length of Caudal Femur
♂, Darwin, N.T.	26.0	5.7	3.0	22.3	15.8
♂, Darwin, N.T.	28.6	6.3	3.5	23.7+	16.1
♀, Adelaide River, N.T.	35.5	7.5	4.2	29.3	21.0
♀, Brock's Creek, N.T.	29.5	6.0	3.5	24.4	17.1
♀, Brock's Creek, N.T.	37.0	7.8	4.5	31.2	21.3
♀, Ivanhoe Station, W.A.	30.0	6.5	4.0	27.2	19.3
♀, Kimberley Research Station, W.A.	35.0	6.8	4.4	29.6	19.8
♀, Kimberley Research Station, W.A.	40.0	8.8	5.7	33.0	23.6

The species is known only from the northern portion of the Northern Territory and the adjacent Kimberley area of Western Australia. Whether *curvicerus* extends a greater distance into the interior than the localities here given remains to be determined.

BERMIUS BRACHYCERUS Stål

This species is widely distributed in eastern Queensland and over most of New South Wales, as well as the Australian Capital Territory, and breaks up into three regionally limited subspecies. Records of *brachycerus* from outside the above broadly defined area are in past literature, but I believe that re-examination of the material reported will show errors of determination. This I find to be the case in at least several instances in this genus where the originally recorded specimens have been made available to me, and corrections are here made accordingly.

I regard the three entities mentioned above as geographic subspecies, although intergradation is but partially evidenced by the material in hand. However, instability toward the periphery of ranges is apparent at certain localities, and this is clear indication of the interdigitation usually manifest in areas between the broader sweep of complementary subspecies.

The three forms are characteristic of three well-marked physiographic areas, one of the Australian Capital Territory and the adjacent Southern Tablelands of New South Wales (*B. b. magistralis*), a second of the more coastal section and areas of the adjacent mountains of eastern Australia from northern Queensland to southern New South Wales (*b. brachycerus*), and the third (*b. planicola*) of the Darling plains of the interior of New South Wales.

BERMIUS BRACHYCERUS Stål

Plate 2, Figs. 17-20; Plate 7, Figs. 74-80

B[ermius] brachycerus Stål, 1878, Bihang K. Svenska Vetenskapsakad. Handl. 5 (4): 92 (♀; Australia; Sydney [New South Wales]); I. Bolívar, 1918, Trab. Mus. Nac. Cienc. Nat.,

Madu., Ser. Zool. No. 34: 27, (Sidney [= Sydney, New South Wales]); Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 94, Plate 3, Figs. 12, 12a, 13, and 13a (♂, ♀; "Australia"; Sydney, New South Wales [exclusive of other localities]⁵⁹); 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 72, 73 (no additional information).

Bermius stali Sjöstedt, 1920, Ark. Zool. 12 (20): 24, 25 (♂; Rockhampton [, Queensland]; Sydney [, New South Wales]); Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 94, 95, Plate 3, Figs. 14, 15, and 15a, b (Rockhampton and Peak Downs, Queensland; Sydney and Claren[ce] River, New South Wales); Sjöstedt, 1931, Ark. Zool. 23A (11): 3 (Brisbane [, Queensland]); Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 72, 73 (Previous records plus Brooklana, East Dorrig, New South Wales).

Bermius cylindricus Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 72, 73 (♀; North Pine River, Queensland).

There is a 1941 record of *brachycerus* by Sjöstedt from Derby, Kimberley district, Western Australia,⁶⁰ which I am quite certain is due to an erroneous determination, and may be found to refer to *B. curvicerus* when the material so determined has been re-examined.

Queensland.—Townsville; 5.ii.1945 (B. Malkin) 1 ♀ (United States National Museum). Rockhampton; 1 ♂ (Museum of Comparative Zoology). 2 miles S. of Killarney;⁶¹ Apr. 1941 (K. H. L. Key) 3 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Brisbane; Apr. 1942 (K. H. L. Key) 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Sunnybank, near Brisbane, 19.xii.1942 (K. H. L. Key and K. R. Norris) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). Mt. Tambourine; (A. M. Lea) 1 ♂ (South Australian Museum). O'Reilly's National Park;⁶² May 1928 (F. N. Blanchard) 1 ♀ (University of Michigan Museum of Zoology). Tugun;⁶³ 6.ii.1948 (K. R. Norris) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). "Queensland"; 1 ♂ (Academy of Natural Sciences of Philadelphia).

New South Wales.—Eltham;⁶⁴ 8.i.1929 (Chadwick) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Marom Creek; 26.xii.1928 (Chadwick) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 10-13 miles N. of Guyra; Mar. 1941 (K. H. L. Key) 2 ♂, 3 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). "The Dorrig", 3000 ft;⁶⁵ Feb. 1921 (Harvard Australian Expedition, P. J. Darlington, Jr.) 1 ♀ (Museum of Comparative Zoology); (W. Heron) 1 ♀ (South Australian Museum). Sydney; Jan., Feb., and Mar. 1939 (K. H. L. Key) 7 ♂, 5 ♀ (Division

⁵⁹ The records of this species from Kimberley district, north-western Australia, and Hermannsburg, central Australia, given by Sjöstedt in 1921, I feel certain do not refer to *brachycerus*. The former may be a misidentification of material of *B. curvicerus*, while the latter may refer to the latter species, to *B. buntamurra* here described, or to a species as yet undescribed.

⁶⁰ Ark. Zool. 33B (16): 6 (1941).

⁶¹ "Situated at the west foot of the Great Divide Range, on the upper Condamine River, about 20 miles ESE. of Warwick." (Information from Dr. Key.)

⁶² Dr. Key writes: "I think this means O'Reilly's property, Lamington National Park".

⁶³ "A resort on the south coast of Queensland, 2 miles NW. of Coolangatta." (Information supplied by Dr. Key.)

⁶⁴ On railway about 15 miles SW. of Cape Byron.

⁶⁵ i.e. the Dorrig Tableland.

of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Wollongong;⁶⁶ 22.iii.1945 (C. E. Chadwick) 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Nelligen;⁶⁷ 2.iv.1948 (K. H. L. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra).

This subspecies, the typical form of *B. brachycerus*, is very close to *B. b. planicola*, which replaces it in the Darling plains section of New South Wales. It is more readily separable from *B. b. magistralis* of elevated areas in or about the Australian Capital Territory. I have seen no material clearly intermediate between *B. b. brachycerus* and *B. b. planicola*, but the existence of that condition is assumed from the minor character of the differences between the two entities.

The synonymy of *stâli* and *cylindricus* is here established after careful study of the entire material of this species available to me, as well as the relevant literature. It is quite evident that Sjöstedt completely failed to grasp the extent of individual variation in this species and subspecies, as in many others, and erected supposedly new species on colour or unimportant structural features which definitely lack specific or subspecific significance.

The form of the apex of the subgenital plate of the male was given by Sjöstedt as a basic difference between *stâli* and *brachycerus*. The difference in this respect shown by his figures is a minor one, which is closely paralleled in intra-specific range in numerous species of other cyrtacanthacridine genera, such as *Melanoplus*, and the extremes which he figures as representing these two species are both present in the limited series of males before me and here recorded from Sydney. The differences shown, and described, are merely in the degree of elevation of the median angulation of the dorso-distal margin of the male subgenital plate, and a slight variability in the strength of the lateral angulations of the same margin. It will be noted that Sjöstedt in 1921 referred a Sydney female to *brachycerus* and a male from the same locality to *stâli*, although he never regarded anything but colour and tegminal length as of value to distinguish females of most of the species of this genus. Regarding colour phases the student is referred to a preceding discussion under the present genus. As far as differences in the coloration of the caudal tibiae are concerned, these are correlated in greater part with the general tonal colour value, which has already been discussed. The range from non-infusate glaucous caudal tibiae to those lined along the flexor carinae with fuscous, or, in increased intensification, with that whole surface infusate, is evident from the present material.

The unique type of *Bermius cylindricus* is described as exceedingly pale, with the usual dark lateral bars at least "subextincta", to use Sjöstedt's words, while the flavido-testaceous caudal tibiae were said to have a single narrow annulus of fuscous, but just where is not stated. Clearly this represents the maximum recessive condition in coloration of *brachycerus*, the dark tibial annulus being perhaps an intra-specific genetic factor not correlated with tonal

⁶⁶ On coast about 10 miles S. of Bulli.

⁶⁷ On Clyde River, near its mouth at Bateman's Bay.

depth. No valid morphological features were given for *cylindricus*. There may be an intra-specific genetic background for the extremes of these colour tonal variants, but there is no broad stability in this respect in individual populations, and certainly there is no warrant for considering these shadings as distinct species or geographic races.

Stål's *brachycerus* was based solely on females, and not, as Sjöstedt states, in part on males, which the latter used later as a partial basis for *stâli*. Stål may have determined males as *brachycerus*, but his name rests on the published information, and he gave the female sex alone as the basis for his name. Stål's type of *brachycerus* was said originally to be in the Stockholm Museum, but Sjöstedt in 1921 credits it to the Museum Godeffroy in Hamburg. Sjöstedt based his *stâli*, in 1920, on two males in the Stockholm Museum from Rockhampton, Queensland, and Sydney, N.S.W., although in 1921 he endeavoured to fix a male from the former locality in the Museum Godeffroy series, which had been determined by Stål as *brachycerus*, as the single type of *stâli*. Whether this specimen is the one from Rockhampton which he originally listed as the property of the Stockholm Museum, and which can justly be regarded as the lectotype of *stâli*, is not clear. To further accentuate the fogginess of the type background for *Bermius ståli*, Sjöstedt in his list of the acridid types in the Stockholm Museum cites as that of *stâli* a female in the same museum,⁶⁸ and there gives a reference to the original description—which latter was based solely on males—and also to his 1921 figures of a male said in the explanation of the latter illustrations to be the "type". The unique type (female) of *Bermius cylindricus* Sjöstedt is the property of the Australian Museum, Sydney.

In the most extensive single series of typical *brachycerus* before me, that from Sydney, I find some slight variation in the exact angle of the outline of the fastigium as seen from the dorsum, but not enough to cause any difficulty in distinguishing *b. brachycerus* from *b. planicola*.

These figures show that there is a marked degree of individual size variation in both sexes in material from the same locality, as demonstrated by the Killarney female extremes, which present maximum and minimum figures for some of the measurements given. Regionally, there seems to be no distinctive correlation of size, although the few individuals seen from the most southern portion of the range of the subspecies are large, but the size range in the females of the series from Killarney, Queensland, far surpasses anything seen from elsewhere.

Remarks.—There is some regional instability in the exact degree of angulation of the fastigium, but this is most manifest in specimens from the mountains, and may indicate intrusive influence of *B. b. planicola*, although I would not call this material intermediate.

⁶⁸ Ark. Zool. 24A (1): 49 (1932).

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂, Rockhampton, Queensland	24.0	5.3	20.5	15.8
♂, Sunnybank, near Brisbane, Queensland	22.5	5.2	18.7	14.6
♂, Marom Creek, N.S.W.	23.2	5.0	18.9	13.8
♂, 10-13 miles N. of Guyra, N.S.W.	22.0	4.7	17.6	14.1
♂, 10-13 miles N. of Guyra, N.S.W.	22.5	5.0	19.3	14.1
♂, Sydney, N.S.W.	21.0	4.4	16.4	12.5
♂, Sydney, N.S.W.	23.8	5.3	19.8	14.5
♂, Nelligen, N.S.W.	26.0	5.6	23.1	15.3
♀, Townsville, Queensland	30.0	6.5	24.1	17.7
♀, 2 miles S. of Killarney, Queensland	30.0	6.3	24.4	17.6
♀, 2 miles S. of Killarney, Queensland	36.5	8.3	29.0	22.8
♀, Brisbane, Queensland	34.5	6.8	25.7	19.2
♀, Tugun, Queensland	34.5	6.6	24.4	18.0
♀, "The Dorrigo," N.S.W.	33.5	6.6	25.5	18.7
♀, 10-13 miles N. of Guyra, N.S.W.	34.0	6.5	23.6	19.0
♀, Sydney, N.S.W.	32.3	6.1	23.1	17.7
♀, Sydney, N.S.W.	31.8	6.5	25.4	18.9
♀, Wollongong, N.S.W.	32.0	6.8	26.8	19.7

Distribution.—This extends over the more coastal section of eastern Australia from as far northward as Townsville, Queensland, southward at least to the vicinity of Nelligen, N.S.W. The only point which might be considered interior from which this form is known to me is the locality of Killarney, Queensland, which really is on the headwaters of a tributary of the Condamine, an affluent of the Darling system. This material, however, is unstable, and probably indicates the influence of *B. b. planicola*, a subspecies of the interior Darling plains. The Guyra and Dorrigo material shows some peculiarities, but appears to be rather aberrant *B. b. brachycerus*. Sjöstedt recorded it from Peak Downs, Queensland, an interior area which, however, is of Pacific coast drainage (Mackenzie River). I have seen no material from this latter locality, but I regard it as one where true *brachycerus* would occur.

*BERMIUS BRACHYCERUS PLANICOLA*⁶⁹ n. subsp.

Plate 2, Fig. 21; Plate 3, Figs. 23-25; Plate 8, Figs. 81-84

This subspecies replaces *B. b. brachycerus* in at least portions of the Darling plains of interior New South Wales. While its differences from material of the more coastal typical subspecies are reasonably evident, they are entirely of degree and very hard to express in words. In the present subspecies the general form is slightly more slender, the fastigium, as seen from the dorsum, averages somewhat sharper and rather more produced, with the angulate outline in that view less broadened, while the interocular space, particularly in the female, is

⁶⁹ i.e. *inhabitant of a plain*, in relation to its major habitat, the Darling plains.

slightly narrower, and the eye outline in the same view, especially in the female, slightly less protuberant laterad.

Type.—♂; Callubri Station, near Nyngan,⁷⁰ N.S.W. March 1939 (K. H. L. Key) (Division of Entomology Museum, C.S.I.R.O., Canberra).

As in *B. b. brachycerus* with the following differences: form slightly more slender than in the male sex of *B. b. brachycerus*, this most evident in the post-ocular section of the head and in the pronotum as seen from the dorsum, the pronotum also with some faint indication of a median transverse constriction, the condition technically referred to as "strangulation". As seen from the dorsum the fastigium is rectangulate in outline, the whole fastigium slightly more produced, and rather narrower, while the interocular space also is slightly narrower than in topotypic Sydney *b. brachycerus*. The constriction of the male pronotum, as seen from the dorsum, is not marked, but is moderately evident when compared with material of typical *brachycerus*. Tegmina, wings, and general body characters, as well as external genitalia, are as in *B. b. brachycerus* in all noteworthy respects.

Allotype.—♀; same data as type (Division of Entomology Museum, C.S.I.R.O., Canberra).

Differing from female topotypes (Sydney) of *B. b. brachycerus* in the following noteworthy respects: general form slightly more slender, particularly the head and pronotum as in the male sex, the median constriction of the pronotum, however, less evident than in the latter. The fastigium, as seen from the dorsum, is definitely rectangulate in outline, the angle itself not as rounded as in *B. b. brachycerus*, and the overall breadth of the fastigium slightly less than in the typical form of the species; interocular space, as in the male, slightly narrower than in *B. b. brachycerus*.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂, Callubri Station, N.S.W., <i>type</i> ..	22.3	4.7	19.0	13.3
♂, Weemabah Station, N.S.W., <i>paratype</i> ..	24.5	5.3	21.1	14.8
♂, Bundemar Station, Trangie, N.S.W., <i>paratype</i> ..	26.3	5.5	22.1	15.4
♂, 5 miles NE. of Gulargambone, N.S.W., <i>paratype</i> ..	23.3	4.8	19.8	14.5
♀, Callubri Station, N.S.W., <i>allotype</i> ..	31.5	6.5	24.4	18.7
♀, Callubri Station, N.S.W., <i>paratype</i> ..	29.5	5.5	21.8	15.9
♀, Bundemar Station, Trangie, N.S.W., <i>paratype</i> ..	33.0	6.9	26.2	19.3
♀, Tullamore, N.S.W., <i>paratype</i> ..	33.0	7.3	26.2	19.2
♀, 5 miles NE. of Gulargambone, N.S.W., <i>paratype</i> ..	33.0	6.8	24.7	18.5

⁷⁰ A railway junction between Bourke and Narromine, about 60 miles NW. of Trangie. Approximate position, 31° 34' S., 147° 14' E.

These figures show that, as in *B. b. brachycerus*, there is an appreciable size range in both sexes and, as the few females from the type locality demonstrate, there is a considerable individual size range at a single point.

Coloration.—The subspecies has the same colour pattern as typical *brachycerus*, although the tones average paler. The single male from 5 miles NE. of Gulargambone is as dark tonally as the average of that sex of *b. brachycerus*, but all other specimens of *b. planicola* seen are slightly to distinctly paler. Only a single specimen seen is in the green phase, this the female from Tullamore. No other individual shows any definite greenish in the base tone of the dorsal surface of the head and pronotum. All the males seen have the dorso-external surface of the caudal femora green like the pagina, except for the dorsal juxta-carinal infuscate lineation, which latter is absent in the Weemabah Station male, as well as in most of the females. Of the females those from Weemabah and Bundemar Stations have the dorso-external surface of the caudal femora light brown, much like the colour of the occiput. The remaining females have this area green or greenish.

Remarks.—There is some plasticity in this subspecies, and its distinctive features are average and also rather subtle. However, the fastigial form and rather more slender pronotum show that the representative of *brachycerus* from the interior plains presents an evolutionary step away from the coastal form on one hand, and from that of the more elevated area of the Australian Capital Territory and its immediate surroundings on the other.

Paratypes.—I am regarding all of the material here referred to this subspecies, other than the type and allotype, as paratype.

Distribution.—Probably the range of this subspecies covers a very large part of the plains of the Darling in interior New South Wales. Present material is from an area bounded by Gulargambone, on the Castlereagh, Tullamore, and the Nyngan district on the Bogan River. Undoubtedly it is more widely spread to the north and probably west. It will probably be found to pass into *B. b. brachycerus* at some of the lower passages through the Eastern Highlands north of the Australian Capital Territory.

Specimens examined.—11; 4 ♂, 7 ♀.

New South Wales.—Callabri Station, near Nyngan; Mar. 1939 (K. H. L. Key) 1 ♂ (type), 3 ♀ (one allotype) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Weemabah Station, near Trangie;⁷¹ Mar. 1939 (K. H. L. Key) 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Bundemar Station, Trangie; 10.i.1944 (L. R. Clark) 1 ♂, 1 ♀^{71a} (Division of Entomology Museum, C.S.I.R.O., Canberra). Tullamore; 8.ii.1937 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 5 miles NE. of Gulargambone; 4.iv.1951 (Key and Chinnick) 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra).

⁷¹ Trangie is in the Narromine district, on the railway between Narromine and Nyngan. Position, 32° 4' S., 148° 0' E.

^{71a} This material enables me to identify as *B. brachycerus planicola* the "*Bermius* sp." of Clark (C.S.I.R.O. Aust. Bull. No. 250 (1949)).

BERMIUS BRACHYCERUS MAGISTRALIS⁷² n. subsp.

Plate 2, Fig. 22; Plate 3, Figs. 26-28; Plate 8, Figs. 85-88

This is the geographic race of *brachycerus* found in the Australian Capital Territory, and doubtless for some distance to the northward at similar altitudes. It apparently passes into *B. b. planicola* westward as the lower country of the Darling plains is approached, and doubtless intergrades eastward with the more coastal *B. b. brachycerus*.

From *B. b. brachycerus* the larger average size of *B. b. magistralis* will usually separate the latter, but the more produced and more sharply angulate fastigium in both sexes is the chief difference, while also in the female the frontal costa is appreciably more shallowly sulcate, and the eyes definitely less prominent as seen from the dorsum. From *B. b. planicola* the present subspecies is separated by the same general size and fastigial features as it is from *B. b. brachycerus*, while in addition it has a slightly more robust build.

Type.—♂; Cotter River,⁷³ Australian Capital Territory. January 1938 (T. G. Campbell) (Division of Entomology Museum, C.S.I.R.O., Canberra).

As in *B. b. brachycerus* and *B. b. planicola* with the following differences: size larger than the average of either of the other subspecies, form slightly stouter, the pronotum hardly at all "strangulate". As seen from the dorsum the fastigium is slightly acute in outline, with the apex narrowly transverse truncate, while the whole fastigium is somewhat more produced cephalad of the eyes than in either of the other subspecies; the interocular space is as broad proportionately as in topotypic material (Sydney) of *B. b. brachycerus*. The pronotum is hardly at all constricted. Tegmina and wings with their apices surpassing those of the abdomen and of the caudal femora. Subgenital plate slightly more elongate than in the other subspecies of *brachycerus* as viewed in profile.

Allotype.—♀; same data as type (Division of Entomology Museum, C.S.I.R.O., Canberra).

Differing from *B. b. brachycerus* and *B. b. planicola* in the following noteworthy respects: size definitely larger than the average of either of the other subspecies, form slightly more robust, the pronotum virtually lacking any "strangulation" although it is very weakly expanding caudad. The fastigium, as seen from the dorsum, rectangular in outline, but more produced than in *B. b. planicola*, and, as in the male, with the angle itself narrowly transverse truncate, interocular space relatively broad; outline of eyes, as seen from the dorsum, appreciably less protuberant than in the same sex of either of the other subspecies, the convexity of their outline relatively low. Tegmina and wings with their apices briefly surpassing those of the abdomen and of the caudal femora.

⁷² i.e. pertaining to a chief, in relation to its larger size.

⁷³ South-west of Canberra, in a mountain valley, flowing into the upper Murrumbidgee River (Murray drainage).

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂, Cotter River, A.C.T., <i>type</i>	28.5	6.3	24.7	17.4
♂, Sullivan's Creek, A.C.T., <i>paratype</i>	25.5	5.8	22.0	16.6
♂, Sullivan's Creek, A.C.T., <i>paratype</i>	27.3	6.1	24.7	16.7
♀, Cotter River, A.C.T., <i>paratype</i>	35.0	7.3	28.6	22.4
♀, Cotter River, A.C.T., <i>allotype</i>	35.5	6.8	29.1	22.0
♀, Molonglo River, A.C.T., <i>paratype</i>	37.0	7.9	26.8	23.4
Atypical <i>B. b. magistralis</i>				
♂, Canberra, A.C.T.	27.0	6.3	24.7 ⁷⁴	17.1
♀, Black Mountain, A.C.T.	36.0	7.8	27.7	22.1
Intermediate between <i>B. b. magistralis</i> and <i>B. b. planicola</i>				
♂, Jeir, N.S.W.	25.5	5.7	21.8	15.4
♂, 5 miles NE. of Wee Jasper, N.S.W.	26.2	5.7	21.6	15.8
♀, 5 miles NE. of Wee Jasper, N.S.W.	31.7	7.1	28.5	19.3

These figures show evidence of an appreciable individual size range, but less than that which the series of *B. b. planicola* shows for that subspecies.

Coloration.—The coloration of *B. b. magistralis* is of the same basic pattern as in the other subspecies of *brachycerus*, but the tones are duller and less contrasted than in *B. b. brachycerus*, in this more as in *B. b. planicola*, although the brown tones are not quite as pale as in the latter. None of the specimens of typical *B. b. magistralis* now before me is in the green phase, and none has the dorsum of the head and pronotum pea green, although one of the females from near Wee Jasper, intermediate between this subspecies and *B. b. planicola*, has this condition quite vividly marked. But three males of typical *B. b. magistralis* have the caudal femora largely green, the one from the Cotter River and the two from Sullivan's Creek. The other specimens from both of these localities have the caudal femora largely brownish. The two specimens from Canberra and the Molonglo River respectively have the caudal femora largely yellow-green or green, as do all the specimens intermediate between *B. b. magistralis* and *B. b. planicola*. The latter are all much more contrastingly coloured than those of typical *B. b. magistralis*. All the specimens from the Cotter River, including the type and allotype, are labelled as "discoloured", hence their coloration is not discussed more fully. However, in all the specimens of *B. b. magistralis* seen, the blackish dorso-external lineation of the caudal femora is indicated to some degree, usually a well-marked one.

Remarks.—While there is some variation in the exact angle of the fastigium in the material of this subspecies, the latter seems to be reasonably well marked, although it probably has a very limited distribution. It is clearly on average the largest of the components of *Bermius brachycerus*, even though it is the one which occurs in a region of lower winter temperatures. Apparently to the east-

⁷⁴ Apices slightly frayed, hence length slightly less than that of perfect condition.

ward it is subject to the influence of typical *brachycerus* infiltrating inland from coastal areas, and similarly it clearly passes north-westward of the general area of the type locality into *B. b. planicola* of the lower Darling, and probably Murray, plains.

Paratypes.—I regard all the material before me from the type locality, other than the type and allotype, and that from Sullivan's Creek and the Molonglo River, as paratypic.

Distribution.—The range of this subspecies, as far as at present known, is limited to the Australian Capital Territory, becoming atypical in the more eastern part of the same, and probably progressively passing in that direction into typical *brachycerus* of the eastern coastal region. To the north-westward it intergrades with *B. b. planicola* of the interior plains. What the extent of the distribution of this subspecies north-eastward along the Blue Mountains elevation, or southward into Victoria, may be, remains for future work to determine.

Specimens examined.—17; 12 ♂, 5 ♀.

Australian Capital Territory.—Cotter River; Jan. 1938 (T. G. Campbell) 2 ♂, 3 ♀ (*type, allotype, and paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Sullivan's Creek;⁷⁵ 11-12.i.1938 (K. H. L. Key) 9 ♂ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Molonglo River;⁷⁶ 27.iii.1930 (L. F. Graham) 1 ♀⁷⁷ (Division of Entomology Museum, C.S.I.R.O., Canberra).

Atypical *B. brachycerus magistralis*

Australian Capital Territory.—Canberra; 1940 (D. A. C. Cameron) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). Black Mountain, Canberra; 28.iii.1935 (A. L. Tonnoir) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra).

Intermediate between *B. b. magistralis* and *B. b. planicola*

New South Wales.—Jeir,⁷⁸ NW. of Hall; 10.i.1945 (L. R. Clark) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 5 miles NE. of Wee Jasper;⁷⁹ 19.ii.1951 (Key and Chinnick) 2 ♂, 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia).

⁷⁵ "A small tributary of the Molonglo River, running through the suburbs of Canberra." (Information from Dr. Key.)

⁷⁶ One of the head tributaries of the Murrumbidgee River, flowing through Canberra, its upper course to the south-east of Canberra higher than the elevation of the latter locality.

⁷⁷ This specimen was hand-labelled by Sjöstedt in error as *Berminus odontocercus*. Apparently it was never so recorded in print.

⁷⁸ On tributary of upper Murrumbidgee, about 18 miles air-line due N. of Canberra. Elevation about 2000 ft. Position 35° 4' S., 149° 2' E.

⁷⁹ Wee Jasper is "a village on the Goodradigbee River, 10 miles upstream from its junction with the Murrumbidgee (NW. of A.C.T.)." (Information from Dr. Key.)

*BERMIUS BUNTAMURRA*⁸⁰ n. sp.

Plate 3, Figs. 29-32; Plate 8, Figs. 89-95

This quite distinct species is a member of the *brachycerus* line of the genus, but can at once be separated from the components of that species by its proportionately robust form, blunter head with less strongly angulate fastigial outline, as seen from the dorsum, less produced fastigio-facial angle as seen in profile, more decurved distal section of the male cerci, and the marked quadri-rugose character of the proximal section of the male supra-anal plate. In size it also averages larger than any of the subspecies of *B. brachycerus* except the more attenuate montane *B. b. magistralis* of the Australian Capital Territory area.

Type.—♂; Tickalara H[ead] S[tation] (New), Queensland.⁸¹ May 18, 1949 (K. H. L. Key) (Division of Entomology Museum, C.S.I.R.O., Canberra).

Size relatively large for the genus (length of body, 27 mm); form stouter and more robust proportionately than in *B. brachycerus*.

Head with its exposed dorsal length subequal to the greatest caudal breadth of the head as seen from the dorsum, in profile the line of the occiput slightly more bullate than in *brachycerus*; fastigio-facial angle as seen in profile slightly broader than rectangulate and much less produced than in *brachycerus*, a brief interantennal section of the facial line weakly subvertical whence the latter ventrad is obliquely straight declivent; fastigium as seen from dorsum sub-rectangulate in outline, the immediate angle rounded, the length of the fastigium cephalad of the interocular space equal to only seven-tenths of the greatest breadth of the fastigium, fastigial disk but faintly impressed within the margin, interocular space subequal to the fastigial length cephalad of this interspace; frontal costa broad, its interantennal breadth slightly greater than that of the proximal antennal article,⁸² approximately subequal in breadth and with bordering carinae subparallel thence ventrad, sulcation entire and distinct but shallow, much shallower than in the same sex of *B. b. brachycerus*; lateral facial carinae well marked, moderately diverging ventrad; eyes as seen from dorsum moderately prominent, to the same degree as in the same sex of *B. b. brachycerus*, the greatest breadth across the eyes compared with that across the genae as 8 to 7, basal outline of eye, as seen in profile, more broadly ovate than in *B. b. brachycerus*, more rounded both dorsad and ventrad, its breadth equal to three-fourths of its depth, the latter slightly more than twice the length of the infra-ocular sulcus (as 16 to 7). Antennae approximately twice as long as the dorsum of the pronotum, composed of 25 articles.

⁸⁰ The name of an important aboriginal tribe of south-western Queensland, an area which is the home of this species.

⁸¹ In south-western Queensland, due W. of Lake Bulloo, and at east base of Grey Range. Approximate position, 28° 42' S., 142° 11' E.

⁸² These are subequal in breadth in *B. brachycerus brachycerus*.

Pronotum proportionately broader than in *B. b. brachycerus*, the greatest breadth across lateral lobes caudad being equal to three-fourths of the median length of the pronotal disk,⁸³ the form weakly sellate dorsad as seen in profile; cephalic margin of disk very low arcuate, caudal margin broadly arcuate and but little produced; three transverse sulci moderately impressed on disk, their extension on the lateral lobes as in *B. b. brachycerus*, prozona appreciably longer than metazona (as 19 to 15), surface of disk less densely impresso-punctate on the prozona than on the metazona except that near the cephalic border the cribrosity is denser and much as on the metazona, median carina distinct but low on the metazona, subobsolete on the prozona, surface of lateral lobes with the metazona and the vicinity of the cephalic and ventral margins thickly impresso-punctulate: lateral lobes with their depth from dorsal profile of the pronotum equal to five-sevenths of the dorsal length of the lobes in the usual position of discal lateral carinae, cephalic margin somewhat oblique and faintly subarcuate, ventro-cephalic angle rounded obtuse, ventral margin subsinuate with a broad and low obtuse-angulation mesad, ventro-caudal angle narrowly rounded, caudal margin oblique, faintly concave.

Tegmina surpassing the apex of the abdomen by a distance nearly equal to the dorsal length of the head, apex faintly oblique but well rounded, marginal field with proximal lobation no more developed than in *B. b. brachycerus*, reticulation of proximal half of tegmina as dense and as subcoriaceous as in *B. b. brachycerus*. Wings reaching to the tegminal apices when in repose.

Prosternal process moderately oblique, apex blunt acute. Mesosternal lobes subquadrate, very narrowly separated mesad; metasternal lobes in contact caudad of the trigonal depression of the fossae.

Apex of the male abdomen moderately recurved; ultimate tergite lacking furcula but with a pair of submedian depressions separated by a median carinula; supra-anal plate scutelliform with the proximal two-fifths broad and with subparallel lateral margins, while the distal three-fifths has the lateral margins sigmoidally converging distad to the acute apex, surface of the supra-anal plate with the proximal third bearing four short, stout, subparallel, longitudinal, rounded rugae, the median pair more deeply separated from one another than they are from the more lateral ones, the remaining surface of the plate rather sharply cut off and appreciably excavate with a median pair of longitudinal rugae enclosing a deep sulcus, this covering nearly one-half the length of the plate, but failing to reach the immediate apex, which is upturned in the type;⁸⁴ cerci much as in *B. b. brachycerus* but more decurving distad as seen in profile; subgenital plate essentially as in *brachycerus* with the three points (median and laterals) of the distal margin similarly developed.

⁸³ In *B. b. brachycerus* the breadth is equal to seven-tenths of the discal length.

⁸⁴ This condition may not be normal, but the only other male has the apex of the plate covered with extended soft integument, and I do not wish to imperil that specimen by further manipulation.

Cephalic and median limbs and caudal femora as in *B. b. brachycerus*, except that the apices of the genicular lobes of the caudal femora are subrectangulate and not acute; caudal tibiae with 9 external and 10 internal spines.

Allotype.—♀; same data as type (Division of Entomology Museum, C.S.I.R.O., Canberra).

Differing from the preceding description of the male sex chiefly in the following respects.

Form distinctly heavier and more robust than in *B. b. brachycerus*.

Head with its exposed dorsal length slightly less than the greatest caudal breadth of the head as seen from the dorsum (as 30 to 32); fastigio-facial angle as seen in profile similarly angulate to what we find in the male, but the angle itself is much more broadly arcuate, the facial line rounding from the rounded fastigio-facial angle into the obliquely subarcuate more ventral retreating section; fastigium as seen from the dorsum broadly obtuse-angulate in outline, the immediate angle broadly arcuato-truncate, the length of the fastigium cephalad of the interocular space equal to but slightly more than half of the greatest breadth of the fastigium (as 8 to 15), fastigial disk distinctly but shallowly excavate, the depression in proportion much narrower longitudinally than in the same sex of *B. b. brachycerus* and transversely arcuate with its lateral borders obliquely truncate; interocular space about one and one-third times as great as the fastigial length cephalad of the same point (as 11 to 8); frontal costa slightly broader proportionately than in the female of *B. b. brachycerus* but less deeply sulcate, the interantennal breadth of the costa equal to 1.5 times the breadth of the proximal antennal article; eyes as seen from dorsum slightly less prominent than in the same sex of *B. b. brachycerus*, the greatest breadth across the eyes compared with that across the genae as 17 to 16, basal outline of eye as in the female of *B. b. brachycerus*, its breadth equal to three-fifths of its depth, the latter twice the length of the infra-ocular sulcus. Antennae slightly less than twice as long as the pronotal dorsum.

Pronotum proportionately as in the male sex, hardly at all sellate in profile, the dorsal line nearly straight, rising but slightly caudad; transverse sulci, median carina, and sculpture of pronotum as in the male; lateral lobes as in male except that the caudal margin is slightly sigmoid as well as oblique.

Tegmina reaching to the apex of the abdomen, apex more narrowly rounded than in the male.

Mesosternal and metasternal lobes and interspaces as in male.

Supra-anal plate trigonal, arched transversely, with a medio-longitudinal sulcus, this briefly interrupted at the middle of its length by the transverse impression of the plate; cerci simple, slender, somewhat tapering, apex blunt acute, failing to reach as far distad as the apex of the supra-anal plate; ovipositor valves and subgenital plate as in the female of *B. b. brachycerus*, except that the median production of the distal margin of the latter is somewhat narrower and sharper than in the previously known species.

Cephalic and median limbs faintly stouter than in the female of *B. b. brachycerus*; caudal femora with genicular lobes less produced than in *B. b. brachycerus*.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂, Tickalara H.S. (new), Queensland, <i>type</i>	27.0	5.5	23.9	15.9
♀, Tickalara H.S. (new), Queensland, <i>allotype</i>	40.0	7.6	30.4	22.1
♀, Tickalara H.S. (new), Queensland, <i>paratype</i>	30.5 ⁸⁵	6.0	21.8	17.4

These measurements, which for the females represent the extremes of the four of that sex before me, make evident that this well-marked species varies greatly in size at the same locality. In this respect it is in accord with other members of the genus. The males before me are very similar in size, but judging from congeneric species I believe that a sufficient series would show approximately the same size variation in both sexes.

Coloration.—No completely green-phase individuals have been seen, although there is a more contrasting green tone to the genae, mandibles, lateral lobes of the pronotum, greater part of pleura, and costal margin of the tegmina in two of the four females (including the allotype) than in the other females or in the males. The general colour pattern is the same as in other members of the genus, i.e. marked dark post-ocular bars extending from the eyes caudad over the lateral lobes of the pronotum, these bars bordered ventrad in females by a very pale lineation which separates the dark bar from a more ventral area which is always relatively pale, the pleura bear dorsad a juxta-tegmina pale bar, largely as wholly pale flesh colour; while the tegmina, in all seen, are nearly or quite unicolorous with the dorsum of the head and pronotum, except in the above-mentioned females where the marginal field is contrastingly green. General tone of the males and of the two more brownish females examined ranges from as light as ochraceous-tawny to as dark as cinnamon-brown (the latter in the type), occasionally somewhat more rufescent on the pronotum (in several of the females), and again slightly paler on the anal field of the tegmina, and more rarely on the discoidal field also, while in one paratype female there is a faint greenish wash to the anal field. The face between the lateral carinae, and the clypeus and labrum as well, are washed solidly with tawny to russet, although in the more greenish female paratype above-mentioned this is weaker and more tintured with greenish on the clypeus and labrum than in the others; eyes tawny-olive to dresden brown; antennae of the colour of the face. Dark post-ocular bars cinnamon-brown to prout's brown, pale bordering lineation to same

⁸⁵ Abdomen somewhat shrunken.

light lumiere green; pale tone of genae, lateral lobes of pronotum and base colour of pleura ranging from dull ochraceous-buff (in males and one female) to apple green. Green of marginal field of tegmina in two females peacock green. Cephalic and median limbs ranging from the general colour to dull apple green (one paratypic female). Caudal femora with dorsal faces and distal section of the base colour, lateral face pale yellow-green ventrad, progressively darkening dorsad to dorso-external carina, the paler colour as light as light yellow-green, while dorsad it is as deep as dark green of Ridgway; caudal tibiae uniformly glaucous except that proximal extremity is of the general tone, carinae of flexor surface occasionally (two females) subobsoletely lined with fuscous; caudal tarsi of body colour, rarely washed with greenish (one female).

Paratypes.—All the material now before me from the type locality, in addition to the type and allotype, is regarded as paratypic.

Remarks.—This species is clearly a divergent member of the *brachycerus* stem of the genus, in a number of features suggesting a passage to *Tolgadia*, the genus here following *Bermius*. However, in the sum total of its features *buntamurra* is a *Bermius*, rather than a *Tolgadia*. Whether Sjöstedt's 1921 record of *B. brachycerus* from Hermannsburg, N.T.,⁸⁶ represents this species remains to be determined, as at this time no material of the genus from central Australia is available. The single specimen from Winton, Queensland, here reported, was received after the preceding description was completed, but the geographic data have been modified to include its locality.

Distribution.—Central and south-western Queensland.

Specimens examined.—7; 3 ♂, 4 ♀.

Queensland.—Tickalara H[ead] S[tation] (new); 18.v.1949 (K. H. L. Key) 2 ♂ (*type* and *paratype*), 4 ♀ (*allotype* and *paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Winton;⁸⁷ (Lea) 1 ♂ (South Australian Museum).

Genus TOLGADIA Sjöstedt

Tolgadia Sjöstedt, 1920, Ark. Zool. 12 (20): 23; Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 84, 98; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 60, 75.

Genotype (by monotypy) *Tolgadia brachyptera* Sjöstedt.

While three species here regarded as members of the genus *Tolgadia* were previously considered as representatives of *Bermius*, the two genera are well separated. The reason for this situation is that those forms so regarded are not brachypterous, as is the genotype of *Tolgadia*, two being fully alate and one mesopterous. However, it is now evident that the features which distinguish *Tolgadia* from *Bermius* are not alar ones, and the mesopterous *Tolgadia* (*T.*

⁸⁶ Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 94. Sjöstedt there regarded this material as of an unnamed variety of *brachycerus*.

⁸⁷ Central interior Queensland near the head of the Diamantina drainage. Position, 22° 19' S., 143° 4' E.

infirmus) is in this respect transitional between the fully alate and the brachypterous extremes of the genus.

In the sum total of its features *Tolgadia* parallels *Bermius* in being an endemic derivative from the same basic oxyinid stock, but the former apparently is either less adaptable or a younger type, as its distribution is much less extensive than that of *Bermius*, even though it contains as many recognizable entities. While the known material of the genus is exceedingly limited, and hence present conclusions may prove premature, *Tolgadia* does not seem to have been able to penetrate southward into interior Queensland, nor into New South Wales. Its preference apparently is for more tropical or subtropical conditions.

The six species of the genus, aside from the distinctive *tortilis*, show a regular passage from *cairnensis* at one extreme to *campbelli* at the other, and while these two extremes may suggest that the genus is composed of two groups, as already stated *T. infirma* is a direct and complete transition. The male sex is known of all but two of the six species, the female sex of all.

Generic features.—Body moderately elongate, relatively slender, in general proportions much resembling *Bermius*, fully alate, mesopterous or brachypterous; body surface much as in *Bermius* but hairs fewer and chiefly evident on the pleura. Head blunter and proportionately broader than in *Bermius*; fastigium much less produced than in *Bermius*, in outline as seen from the dorsum arcuato-subangulate or at most broadly obtuse-angulate (in ♂), its disk shallowly excavate, no lateral foveolae present; frontal costa sulcate throughout, more broadly so and usually with less sharply cut lateral carinae than in *Bermius*; lateral facial carinae well developed; eyes less prominent than in *Bermius*, in basal outline subelliptical to ovate or (rarely) ovoid; antennae as in *Bermius*. Pronotum subcylindrical, occasionally subsellate, with three distinct but shallowly engraved transverse sulci on the disk, the principal (caudal) one placed more definitely caudad of the middle than in *Bermius*, emphasis of sulci on lateral lobes as in latter genus; median carina of disk as in *Bermius*, no lateral discal carinae present and weak humeral shoulders on metazona even more rounded than in *Bermius*; cephalic margin of disk broad arcuate to subtruncate, caudal margin very weakly angulate mesad; lateral lobes similar to but in general more longitudinal than in *Bermius*, ventral border rather strongly cingulate and sinuate in contour. Tegmina varying in length from shorter than the pronotum to reaching to the abdominal apex, in the former case normally lanceolate with the apex narrowly rounded, in the mesopterous species (*infirmus*) acuminate, and in the brachypterous ones with the apex quite broadly (*campbelli*) or very narrowly (*brachyptera*) rounded, in the brachypterous species the tegmina are narrowly separated dorsad; macropterous species with the marginal field evenly narrowing in breadth from the proximal sixth, and with an intercalary vein well marked, the mesopterous species have the greatest breadth of the marginal field at two-fifths of the tegminal length, while in the brachypterous species the greatest tegminal breadth is mesad or distad of the middle. Wings developed proportionately with the tegmina. Prosternal spine conical, moderately stout, not touching the mesosternum; mesosternal lobes

subattingent to narrowly separated. Cephalic and median femora of male moderately inflated when compared with those of female. Caudal femora much as in *Berminus* but genicular lobes with apices acute-angulate; caudal tibiae as in *Berminus*, apical spine present on both margins, exclusive of this with 8-9 external and usually 10 (rarely 9) internal spines; tarsi as in *Berminus* but external claw is slightly shorter than internal one in brachypterous species. Cerci of male simple, tapering, acuminate at apex, falcate or sigmoid; subgenital plate of male moderately produced mesad into an apically transversely truncate process; ultimate tergite of male with or without well-developed furcula with short triangular arms; supra-anal plate of male broad, scutellate, with its lateral margins marked off from the distal section by a distinct obtuse-angulation, its distal margin obtuse-angulate, its surface with a medio-longitudinal sulcation and more lateral paired lobulate structures and sometimes pit-like depressions. Ovipositor valves of female of usual type, margins of valves entire or micro-serrulate; subgenital plate of ♀ with distal margin having well-marked lateral rounded flange-like lobations.

Distribution.—From the Kimberley district of Western Australia across the northern section of the Northern Territory and south-eastward over coastal and adjacent portions of Queensland at least as far as Port Curtis and Rannes. There are no records from the Cape York section of Queensland north of the Atherton Tableland, nor from the Gulf of Carpentaria section, although *Tolgadia* probably occurs there. It is not known from central or southern Northern Territory, nor from truly interior Queensland.

KEY TO THE SPECIES OF *TOLGADIA*

Females

1. Fully alate, tegmina and wings reaching nearly or quite to the apex of the abdomen 2
- Mesopterous to brachypterous, tegmina in length ranging from lobiform to at most not surpassing the middle of the abdomen, the wings reduced in proportion 4
2. General form more slender. Fastigium as seen from dorsum more strongly transverse. Lateral lobes of pronotum shallower and proportionately more longitudinal. Caudal femora more slender as seen in profile. Lateral plate at external base of ventral ovipositor valves shorter, deeper, and less produced distad 3
- General form more robust. Fastigium as seen from dorsum not as strongly transverse. Lateral lobes of pronotum deeper and proportionately shorter. Caudal femora more robust and deeper proportionately. Lateral plate at external base of ventral ovipositor valves longer, shallower, and more acutely acuminate distad. (Northern Queensland.) *tortilis* n. sp.
3. Smaller (length of body, 30.31 mm; of tegmen, 18.2-21.0). Eyes with their basal outline as seen in profile broader proportionately, ovate. Frontal costa with lateral bordering carinae individually narrower, more sharply

defined. Ulnar area of tegmina with a longitudinal dividing nervure.⁸⁸ (Face between lateral facial carinae vinaceous, atomaceously sprinkled with fuscous.⁸⁹ Tegminal intercalary vein at least in part lined with fuscous.) (Northern Queensland and Northern Territory.)

cairnsensis Sjöstedt

Larger (length of body, 36.5 mm; of tegmen, 27.7). Eyes with their basal outline as seen in profile narrower, ovoid, more acute dorsad. Frontal costa with lateral bordering carinae individually broader and less sharply defined. Ulnar area of tegmina without a longitudinal dividing nervure.⁸⁸ (Face between lateral facial carinae pale.⁸⁹ Tegminal intercalary vein not lined with fuscous.) (Kimberley district, Western Australia.)

bivittata Sjöstedt

4. Tegmina mesopteroous, overlapping meso-dorsad, apices moderately acute. Lateral plates of ventral ovipositor valves distinctly narrower and more tapering acuminate distad, dorsal margin of same regularly and less strongly arcuate. Subgenital plate with distal margin arcuate. (Queensland and Northern Territory.) *infirmis* (Stål)

Tegmina brachypteroous, more lateral, not definitely overlapping meso-dorsad. Lateral plates of ventral ovipositor valves broader, not evenly tapering, dorsal margin not as regularly arcuate as in alternate category. Subgenital plate with distal margin acute-angulate produced mesad 5

5. Size smaller (length of body, 26.5 mm). Outline of fastigium as seen from dorsum obtuse-angulate, weakly flattened mesad; fastigio-facial angle sharper as seen in profile; eyes narrower in basal outline. Supra-anal plate in general outline equilateral. Caudal limbs less elongate and stouter proportionately. (Queensland.) *brachyptera* Sjöstedt

Size larger (length of body, 31.0-34.5 mm). Outline of fastigium as seen from dorsum virtually arcuate, not truly angulate; fastigio-facial angle blunter and more rounded as seen in profile; eyes broader in basal outline. Supra-anal plate more elongate, longer than proximal breadth, rostrately produced meso-distad. Caudal femora somewhat more elongate and slender. (Northern Queensland and Northern Territory.) *campbelli* n. sp.

*Males*⁹⁰

1. Male cerci sigmoid as seen from the dorsum. (Fully alate. No furcula present on ultimate abdominal tergite.) (Northern Queensland.)

tortilis n. sp.

Male cerci never sigmoid as seen from the dorsum, instead weakly or moderately falcate 2

2. Fully alate, tegmina and wings reaching to apex of abdomen. No furcula present on ultimate abdominal tergite. (Frontal costa quite deeply

⁸⁸ i.e. there is, or is not, a longitudinal dividing nervure between the ulnar vein and the posterior ulnar vein.

⁸⁹ This may prove to be merely an individual feature made more evident by the very limited size of the available series. In consequence I am not regarding it as a critical feature.

⁹⁰ This sex is not known of *bivittata* or *campbelli*.

sulcate dorsad, its carinate margins evenly converging dorsad of the median ocellus.) (Northern Queensland and Northern Territory.)

cairnsensis (Sjöstedt)

Mesopterous to brachypterous, tegmina lateral and lobiform, or at most not surpassing the middle of the abdomen, the wings reduced in proportion. Definite furcula present on ultimate abdominal tergite . . . 3

3. Tegmina mesopterous, overlapping mesodorsad, apices moderately acute. Furcula of ultimate abdominal tergite distinct but low, with arms separated by an interspace equal to but little less than two-fifths the proximal breadth of the supra-anal plate, the outline of the latter more subquadrate. Subgenital plate with its distal process shorter and less produced. (Queensland and Northern Territory.) . . . *infirmus* (Stål)

Tegmina brachypterous and lateral, apices rounded. Furcula of ultimate abdominal tergite more prominent, the arms closely placed, not at all spaced off from one another.⁹¹ Supra-anal plate with lateral margins distinctly converging to disto-lateral marginal angles.⁹¹ Subgenital plate with its distal process longer and more produced.⁹¹ (Queensland.)

brachyptera Sjöstedt

TOLGADIA CAIRNSENSIS (Sjöstedt)

Plate 3, Fig. 33; Plate 4, Figs. 35-37; Plate 8, Figs. 96-100; Plate 9, Figs. 101-103

Bermius cairnsensis Sjöstedt, 1930, Ark. Zool. 21A (21): 11, Plate 1, Fig. 4, [♀; Cairns district, Queensland]; Sjöstedt, 1935, Kongl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 73, 74 [additional comparative information].

Northern Territory.—Brock's Creek; 2.iv.1936 (T. G. Campbell) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra).

Queensland.—Cairns; 1 ♂ (*allotype*) (South Australian Museum). Cairns district; (A. M. Lea) 1 ♀ (South Australian Museum).

The removal of this species from *Bermius* to the present genus has been discussed under *Bermius*. The original material consisted of four females from the Adelaide [South Australian] Museum. To that institution, as the original description states, i.e. "Mus. Adelaide (typ.) et Stockholm", the selected lectotype must belong, regardless of Sjöstedt's later (1932) assignment of it to the Stockholm Museum.⁹²

The material referred to *cairnsensis* is clearly conspecific, and it is possible that the female from "Cairns distr." may have been one examined by Sjöstedt at the time the species was described, as the geographic and collector data are the same as given by Sjöstedt for the original material from the South Australian Museum. While this specimen bears no identifying label it could conceivably

⁹¹ These features are drawn entirely from Sjöstedt's original figure of the male of the species and his description of the genus *Tolgadia*, of which *brachyptera* was the type and the only species then known to him which he regarded as belonging to that genus.

⁹² Ark. Zool. 24A (1): 49.

be a paratype of the species. The Brock's Creek record considerably extends the range of the species. The Cairns male is the first male known, and hence the allotype of the species.

The following description was drawn from the Brock's Creek female, which is here figured.

Alate; form slender, as in the other members of the genus; body surface relatively glabrous laterad and ventrad, dorsum of head and pronotum relatively dull and lustreless, micropunctulae of the metazona and cephalic border of the pronotum present but little evident.

Head with breadth across eyes slightly greater than that across genae (as 28 to 25), occipital outline well arcuate as viewed in profile; fastigium strongly transverse, little produced, its greatest breadth equal to slightly over 2.4 times its length cephalad of the cephalic margin of the eyes, its outlines laterad sub-oblique, passing evenly into a poorly defined subtruncate median section, impression of fastigial disk relatively deep, subhexagonal in outline but lacking a caudal delimiting border; interocular space very broad, equal to eight-elevenths of the greatest overall fastigial breadth; fastigio-facial angle as seen in profile rounded obtuse, the fastigial line descending appreciably to join the well-rounded interantennal section of the facial outline, which is strongly oblique thence ventro-caudad; frontal costa broad, nearly equal to half the fastigial breadth (as 5 to 11), its moderately carinate lateral margins straight and subparallel, sulcation shallow but well marked throughout; lateral facial carinae well marked, sinuately diverging ventrad of antennal bases; eyes moderately prominent as seen from dorsum, basal outline ovate, their greatest breadth equal to two-thirds of their greatest length, which is nearly twice the length of the intra-ocular sulcus. Antennae damaged.

Pronotum in general form weakly sellate, subequal in breadth except for a very slight lateral expansion of the lateral lobes ventro-caudad, the greatest length of the pronotal disk somewhat less than 1.5 times the greatest breadth across the lateral lobes (as 36 to 26); cephalic margin of disk broadly low arcuate, caudal margin of same weakly obtuse-angulate; transverse sulci finely engraved, on lateral lobes the first is not extended ventrad and is replaced by a distinct intra-marginal one, as in related genera; median carina very weak on prozona, shallowly elevated on the metazona; prozona nearly 1.6 times as long as the metazona (as 22 to 14); lateral lobes longitudinal, their greatest depth from the dorsal margin of the dark post-ocular bar contained nearly 1.75 times in the dorsal length of the pronotal section of the same bar (as 19 to 33), cephalic margin of lateral lobes oblique and very broadly rounding ventro-cephalad into the subsinuate ventral margin, ventro-caudal angle very narrowly rounded rectangulate, caudal margin virtually straight oblique.

Tegmina fully developed, nearly reaching the apices of the abdomen and the caudal femora, evenly narrowing in breadth distad, the apex very narrowly rounded, costal margin very weakly arcuate at proximal fifth; marginal field little broadened, at widest point (proximal fifth of tegmen) only 1.5 times as

broad as at tegminal base, thence distad regularly narrowing; intercalary vein well marked, ulnar area with a distinct longitudinal median dividing nervure beginning at proximal third of tegmen. Wings, when in repose, reaching to tegminal apices, immediate apex rather blunt acute.

Prosternal spine but slightly inclined, conical, rather stout. Mesosternal lobes subquadrate, meso-caudal angles well rounded, subattingent, interspace between lobes very narrowly hour-glass shaped, the narrowest point at one-third the depth of the lobes, the interspace with its cephalic arms strongly extended; metasternal lobes attingent caudad.

Supra-anal plate trigonal in outline, the apex bluntly rounded, shallowly sulcate medio-longitudinally; cerci conical in profile, very faintly upcurved distad; dorsal ovipositor valves of moderate width, well recurved distad, their dorsal margins faintly crenulato-serrulate, their dorsal surface subshagreenous, ventral valves rather narrow, moderately decurved distad, lateral plates broad, subequal in depth in proximal half, thence distad the dorsal and ventral margins subconcavely converge to the acute apex; subgenital plate with its distal margin rectangulately produced mesad, laterad this margin, overlapping the lateral plates, is arcuately lobate produced into definite flanges, which are well cut off from the median portion by a marginal angulate excision, ventral surface of plate distad with a shallow and broad median concavity.

Cephalic and median limbs essentially as in *Bermius*; caudal femora very slender, their greatest depth (at proximal fifth) contained 5.8 times in their length (as 18 to 105), paginal pattern regular and well impressed, distal tooth of medio-dorsal carina minute and relatively blunt, genicular lobes sub-spiniformly acute; caudal tibiae with 8 external and 10 internal spines (including the apical).

Male allotype (Cairns, Queensland).—Differing from the preceding description of the female sex in the following noteworthy respects.

Head as seen from the dorsum with proportionate breadth across eyes and genae as in the female, but the eyes are somewhat more tumid cephalad and cephalo-dorsad; fastigium much less transverse than in female and distinctly more produced, its greatest breadth equal to but 1.8 times its length cephalad of the cephalic margin of the eyes, its outline as a whole obtuse-angulate, but narrowly and very weakly subtruncate mesad, impression of fastigial disk as marked as in female but much narrower and with its lateral borders somewhat more sharply emphasized and its excavation continued somewhat farther caudad over the interocular area, which latter is equal in breadth to but five-ninths of the overall fastigial breadth; fastigio-facial angle as seen in profile less rounded and more definitely obtuse-angulate, with the outline of the fastigium faintly straighter and more declivent than in the female, interantennal section of the facial outline more oblique and less rounded than in the female; frontal costa much narrower than in the female, its margins evenly converging dorsad from the median ocellus to the fastigio-facial angle, these margins strongly carinate, the median sulcation of the costa deeply impressed dorsad of the

median ocellus, less strongly and more concavely excavate ventrad of latter; lateral facial carinae as in female but more appreciably elevated; eyes somewhat more bullate as seen from dorsum, their basal outline slightly more broadly ovate than in the female, the breadth to length as 13 to 17.

Pronotum as in female except that the cephalic margin of the pronotal disk is subtruncate mesad and the caudal margin of the same is arcuato-obtuse-angulate; median carina of pronotum slightly more evident throughout than in female; lateral lobes somewhat deeper proportionately than in female, their greatest depth from the dorsal margin of the dark post-ocular bar contained 1.6 times in the dorsal length of the pronotal section of the same bar (as 20 to 32), marginal details of the lateral lobes as in the female except that the caudal margin is very shallowly concave.

Tegmina slightly surpassing the apex of the abdomen but falling somewhat short of the femoral apices, in other respects as in the female.

Prosternal spine more attenuate and acuminate than in the female. Mesosternal lobes sublongitudinally quadrate, meso-caudal angles slightly more produced than in the female sex and more narrowly rounded, interspace between lobes very narrow but the latter are distinctly separated throughout; metasternal lobes attinent.

Ultimate tergite without distinct furcula; supra-anal plate of the type usual in males of the genus, the lateral margins with a distinct obtuse-angulation half way between the base and the apex of the plate, the margin of the apex slightly lobulate and obtuse-angulate, medio-longitudinal sulcation well marked in proximal half, constricted mesad and becoming obsolete distad, surface laterad of the median more elevated section appreciably excavate between the latter and the lateral borders, more deeply so nearer the median area than toward the lateral margins, a depressed, subimbricate lobate node present on each side in the general position of a transverse sulcus and slightly nearer the lateral margin than the median line; cerci tapering, more acuminate in distal third, apically subaciculate, lightly incurved as seen from the dorsum, in profile nearly straight, very faintly decurving distad, their apices much surpassing the apex of the supra-anal plate; infra-cercal plates rounded acute at apices, slightly surpassing the apex of the supra-anal plate; subgenital plate much produced, rostrate, its apex surpassing that of the supra-anal plate by a distance about equal to the cercal length, in profile the apex is acute, while seen from the dorsum it is moderately depressed with its margin narrowly transverse truncate, its dorsal surface distad of the anal chamber with parallel concavely excavate impressions separated by a low carinate median elevation.

Caudal femora appreciably deeper and more robust proportionately than in the female sex, their greatest depth (at proximal fifth) contained 5.66 times in their length (as 18 to 102); caudal tibiae with 9 external⁹³ and 10 internal spines (including the apical).

⁹³ This is mentioned solely as statistical information, as I believe that it merely indicates that within the species there is a variation of at least one spine (8-9) in the number present on the external margin.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂, Cairns, Queensland (<i>allotype</i>)	27.6	5.8	19.0	16.9
♀, Cairns district, Queensland, original measurement (ex Sjöstedt)	30.0	6.0-6.8	19.0-21.0	17.5-19.0
♀, Cairns district, Queensland	31.0	6.6	18.2	18.9
♀, Brock's Creek, N.T.	30.3	5.8	20.8	17.6

Coloration.—General tone of dorsum of head and pronotum and base tone of tegmina pale honey yellow (*allotype*) to pinkish ochraceous-buff; sides of head, lateral lobes of pronotum, pleura, all of abdomen and venter chamois or reed yellow to citron green, the thoracic venter sometimes (described female) weakly overwashed with the dorsal tint. Face between lateral carinae infuscate with vinaceous-brown (females) to cinnamon (male), micropunctulate with fuscous in the female, clypeus and labrum pale brick red in the female, or of the face colour in the male; eyes tawny-olive with or without remnants of a cinnamon-brown tone. Post-ocular dark bar reaching from the eye to the caudal margin of the lateral lobes of the pronotum cinnamon-brown, of variable strength and solidity, the immediate post-ocular section invaded by veinings of the dorsal pale colour, oblique genal dark dash extending more or less completely across gena; pleura with two oblique blackish dashes, one extending from the cephalic border to the insertion of the median limbs, the other from the spiracle to the dorsal border of the insertion of the caudal limbs, this variable in emphasis, a similar blackish lining present beneath the proximal section of the costal margin of the closed tegmina. Tegmina with the humeral trunk, the intercalary vein, and the basal portion of the anterior ulnar vein lined contrastingly with prout's brown in the female, this largely absent in the male. Caudal femora line green (male) to reed yellow (female) dorsad, in the female the external face sayal brown increasingly infuscate with cinnamon-brown to prout's brown toward the dorso-external carina; in the male there is a marked pregenicular annulus of light coral red, in the female the ventro-external face is reed yellow, the whole distal section of these femora very weakly washed with tawny, a dot (described female) or a cloud (male) of dark on the proximo-ventral section of the margin of the lateral lobes; caudal tibiae pale glaucous, flexor surface blackish fuscous proximad, in the female this distad confined to the external border, spines and spurs whitish, black-tipped, caudal tarsi glaucous (described female) to pinkish buff. Antennae orange-cinnamon, paling proximad (remaining only in male).

Distribution.—Known only from two localities, in northern Queensland (Cairns district) and the Northern Territory (Brock's Creek). Doubtless the future will show its presence over at least parts of the extensive intervening country.

TOLGADIA BIVITTATA (Sjöstedt)

Plate 4, Figs. 38 and 39; Plate 9, Figs. 104 and 105

Berminus bivittatus Sjöstedt, 1920, Ark. Zool. 12 (20): 24, 25 [♀; Kimberley district, north-western Australia]; Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 94, 97, Plate 3, Fig. 19 [no additional information]; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 73, 74 [no additional information].

Berminus odontocercus Sjöstedt, 1932 (not of Stål, 1878), Ark. Zool. 23A (19): 2 (Wyndham [= Wyndham, Western Australia]); Sjöstedt, 1935 (in part not of Stål, 1878), Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 74 (record from Wyndham, Western Australia).

Western Australia.—Wyndham; l.iv.1930 (T. G. C[ampbell]) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra).⁹⁴

The unique type of this species is in the Stockholm Museum. The specimen now in hand is that on which rests Sjöstedt's erroneous record of *Berminus odontocercus*, a species which is not known from Western Australia, where it seems to be replaced by its analogue *B. curvicerus* Sjöstedt.

This species is relatively close to Sjöstedt's *cairnsensis* of the northern part of Northern Territory and northern Queensland, but is readily separated by the differential features given in the key to the species of *Tolgadia*.

The following description is comparative with that already given of *T. cairnsensis*.

Form slightly more slender, dorsal surface of head and pronotum slightly more glabrous.

Head with breadth across eyes subequal to that across genae; fastigium of the type found in *cairnsensis* but slightly shorter and broader, its greatest breadth equal to 2.6 times its length cephalad of the cephalic margin of the eyes, its outline essentially the same, impression of disk of fastigium as deep as in *cairnsensis* but less subhexagonal in outline, with its cephalic section more broad arcuate and the whole more transverse; fastigio-facial angle in profile and facial line as in *cairnsensis*; frontal costa somewhat broader than in *cairnsensis*, less clearly defined ventrad than in that species, its lateral bounding carinae thicker, more rounded, and less sharply carinate than in *cairnsensis*; eyes appreciably less prominent as seen from dorsum, basal outline slightly more ovoid and less ovate, their greatest breadth equal to approximately three-fourths of their greatest length (as 12.5 to 17). Antennae in length equal to seven-eighths the combined length of the head and pronotum.

Pronotum essentially as in *cairnsensis* but median carina is subobsolete on the prozona and the latter is virtually 1.7 times as long as the metazona (as 27 to 16); lateral lobes slightly longer and shallower proportionately than in *cairnsensis*, their greatest depth from the dorsal margin of the dark post-ocular bar contained nearly twice in the dorsal length of the pronotal section of the same bar (as 22 to 40), marginal form of the lateral lobes as in *cairnsensis*.

⁹⁴ This specimen bears Sjöstedt's long-hand label as *Berminus odontocercus*, and it is clearly the basis of his 1932 record of that species from Wyndham, although he has misquoted the month (giving January instead of April).

Tegmina fully developed, very slightly surpassing the apices of the abdomen and the caudal femora, general outline essentially as in *cairnsensis*, evenly narrowing in distal fourth by the even arcuation of the costal margin in that section to the apex, which in position is slightly sutural of the median axis and narrowly rounded; intercalary vein as in *cairnsensis*, ulnar area lacking a median longitudinal dividing nervure. Wings, when in repose, falling but slightly short of the tegminal apices, immediate apex narrowly rounded with distal fifth of costal margin quite strongly arcuate to the apex.

Caudal femora even slightly more slender than in *cairnsensis*, their greatest depth (at proximal fifth) contained six times in their length (as 21 to 126), genicular lobes with the distal section of their margin more concave than in *cairnsensis* and the apical angulation hence more sharply subspiniform acuminate.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♀, Wyndham, W.A.	36.5	7.3	27.7	20.8
♀, Kimberley district, W.A. (ex Sjöstedt), type	—	—	28.0	—

Coloration.—In general as in *cairnsensis* with the following noteworthy differences: the pale colour of the sides of the head, lateral lobes of the pronotum, pleura, all of the abdomen and venter olive-ochre to dull wax yellow (on the abdomen); face olive-ochre without infumation or micropunctulae, clypeus and labrum passing to clay colour. Post-ocular dark bar distinct but weaker than in *cairnsensis*, particularly dorsad where it grades into the pale dorsal tone, ventral border of dark bar mummy brown, reasonably sharp in definition and contrast on the head and lateral lobes of the pronotum, oblique infra-ocular genal dark bar and pleural bars as in *cairnsensis*. Tegmina with the humeral trunk lined with mummy brown, paling to sepia distad, neither the intercalary nor any portion of the other veins definitely dark-lined; wings with most of the longitudinal veins of the anterior field dark-lined. Caudal femora chiefly cinnamon-buff to clay colour, nearer chamois dorsad, dorsal darkening of the external face as in *cairnsensis*, no dark spot on the margin of the genicular lobes; caudal tibiae as in *cairnsensis*.

Remarks.—This species probably replaces *T. cairnsensis* in the Kimberley district of Western Australia. The two are closely related, and their more obvious differences have already been given. The single specimen before me, the second one of the species recorded, agrees very well with the original description and Sjöstedt's 1921 figure as far as the latter gives definition. The male sex, of course, is as yet unknown.

Distribution.—Kimberley district of Western Australia, the only exact locality known being Wyndham.

TOIGADIA INFIRMA (Stål)

Plate 3, Fig. 31; Plate 4, Fig. 40; Plate 5, Figs. 44 and 46; Plate 9, Figs. 106-109
B[erminus] infirmus Stål, 1878, Bihang K. Svenska Vetenskapsakad. Handl. 5 (4): 92 [♀; "Anstralia borealis" = Port Curtis, Queensland]; I. Bolivar, 1918, Trab. Mus. Nac. Cienc. Nat. Madr., Ser. Zool. No. 34: 27 [no additional information]; Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 94, 97 [Port Curtis (type locality) and Bowen, Queensland]; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 73, 74 [no additional information].
Queensland.—Rannes;⁹⁵ 10.ii.1946 (K. R. Norris) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra).

Northern Territory.—13 miles SE. of Elsey Station;⁹⁶ 29.iv.1947 (A. Stewart) 1 ♂ (*allotype*) (Division of Entomology Museum, C.S.I.R.O., Canberra).

The unique type of this species, from the Brunner Collection, is now in the Vienna Museum. The single female from Bowen, recorded by Sjöstedt in 1921, a discoloured, wet, preserved specimen, formed part of the Hamburg Museum series.

This species clearly connects the longer-winged, more *Berminus*-like species of the genus with the much more abbreviated-winged ones. There can be little doubt but that individuals here regarded as sexes of the same species are correctly associated, even though the localities represented are well separated.

Female (Rannes, Queensland).—Other data already given.

The following features are those of noteworthy difference from the preceding description of *T. cairnsensis*.

Brevialate; form as a whole more evenly cylindrical than in *cairnsensis*; dorsal surface of head and pronotum slightly more glabrous than in *cairnsensis*, micropunctulae of the pronotum slightly more evident.

Head with breadth across eyes faintly greater than that across genae, profile of occipital outline as in *cairnsensis*; fastigium faintly more extensive laterad than in *cairnsensis*, ratio of length cephalad of the cephalic margin of the eyes to the greatest fastigial breadth nearly 2.9 (as 4.5 to 1.3), its outline much as in *cairnsensis* but faintly lower and more broad trigonal than in that species, impression of fastigial disk just as deep but more strongly arcuate in outline cephalad than in *cairnsensis*, and as a whole more circular, while the caudal limit of the impression is clearly marked by an arcuate transverse line; interocular space much as in *cairnsensis*; fastigio-facial angle as seen in profile somewhat more angulate than in *cairnsensis*, more narrowly rounded; facial line as a whole more sharply and somewhat more strongly oblique retreating; frontal costa interantennally appreciably less than half the breadth of the fastigium (as 5 to 13), somewhat broader proportionately ventrad of the median ocellus than in *cairnsensis*, lateral bordering margins somewhat thicker; lateral facial carinae as in *cairnsensis*; eyes much less prominent than in *cairnsensis* as seen

⁹⁵ About 60 miles (air-line) SW. of Rockhampton, on head of Granville Creek (Fitzroy system). Position, 24° 6' S., 150° 8' E.

⁹⁶ On upper Roper River, between Mataranka Station, on the railway from Darwin, and Red Lily Lagoon. Approximate position, 14° 57' S., 133° 20' E.

from dorsum, their lateral outlines in same view subcontinuous with those of the fastigium, basal outline definitely ovoid, regularly narrowing dorso-cephalad, greatest breadth of basal outline at ventro-caudal third and equal to three-fourths of greatest depth, which is twice the length of the infra-ocular sulcus. Antennae rather stout and relatively short, not quite equal to twice the length of the head alone (as 55 to 29), slightly tapering distad.

Pronotum not at all sellate, its dorsal line straight in profile, cylindrical as seen from dorsum with the very faintest caudo-lateral expansion of the lateral lobes, greatest length of the pronotal disk equal to 1.4 times the greatest breadth across the lateral lobes caudad (as 41 to 29); cephalic margin of disk arcuato-truncate, caudal margin as in *cairnensis* but more weakly produced; transverse sulci finely impressed, much as in *cairnensis* but principal (caudal) one mesad is more arcuate cephalad; median carina as in *cairnensis*; prozona to metazona as 25 to 16; lateral lobes with their median depth from the usual position of the dorsal border of a dark post-ocular bar contained twice in the dorsal length of the lateral lobes at the same point, margins of lateral lobes as in *cairnensis*.

Tegmina about twice as long as the pronotum, faintly surpassing the distal margin of the third abdominal tergite, acuminate tapering distad in slightly more than the distal half, apex very narrowly rounded acute; greatest tegminal breadth, at three-eighths of their length, contained three times in the tegminal length; costal margin broadly arcuate, sutural margin nearly straight except for a gentle arcuation to the apex in the distal fifth; marginal field slightly broader than two-fifths of the total tegminal breadth (as 11 to 25), width of anal field equal to slightly less than one-third the entire tegminal breadth (as 7 to 25), mediastine vein strongly developed, reaching to apex of marginal field, intercalary vein represented only by an irregular and indeterminate rudiment, ulnar veins strongly developed, ulnar field with an irregular intercalated nervure present briefly distad. Wings falling short of the tegminal apices by approximately one-third of the tegminal length.

Prosternal spine similar to but more sharply conical than in *cairnensis*. Mesosternal lobes slightly more produced caudad and with their interspace slightly wider than in *cairnensis*, the lobes clearly separated by a narrow interspace; metasternal lobes subattingent.

Cerci similar to those of *cairnensis* but straight as seen in profile; dorsal ovipositor valves slightly more compressed than in *cairnensis*, ventral valves with a more pronounced proximo-lateral shoulder, lateral plates attenuate and acuminate, evenly narrowing distad, the apex produced, the dorsal and ventral margins nearly straight convergent; subgenital plate with median production of caudal margin less prolonged attenuate than in *cairnensis*, the converging lateral sections of that margin shallowly concave, lateral flanges of the plate, overlapping the lateral plates of the ventral ovipositor valves, more elongate than in *cairnensis*, the apex of the flange rounded subacute-angulate, disto-median impression of the ventral surface of the plate less evident and less extensive than in *cairnensis*.

Cephalic and median limbs slightly more robust than in *cairnsensis* but otherwise very similar; caudal femora with the greatest depth (at proximal fifth) contained 5.9 times in their length (as 21 to 125), paginal pattern with its elements wider than in *cairnsensis*, regular, genicular lobes shaped as in that species; sole caudal tibia damaged.

Allotype.—Male; 13 miles south-east of Elsey Station, Northern Territory. April 29, 1947 (A. Stewart) (Division of Entomology Museum, C.S.I.R.O., Canberra).

In general form greatly resembling the female and closely paralleling it in all but features of sexual difference.

Size distinctly smaller than female, similarly brevialate.

Head with breadth across eyes very slightly greater than that across genae (as 23 to 22); fastigio-facial angle in profile sharper than in female, narrowly rounded acute-angulate, the profile of the fastigium more horizontal, straighter, and less declivent than in the female; fastigium as seen from the dorsum more definitely obtuse-angulate in outline with the apex rather broadly rounded but less so than in the female, length of fastigium cephalad of the eye margins equal to half the greatest breadth of the fastigium, impression of fastigial disk less strongly transverse, the greatest length but slightly less than four-fifths of its breadth, caudal boundary of impression on line with cephalic border of eyes; frontal costa somewhat narrower ventrad than in female but of similar general character, lateral bordering carinae faintly and briefly outbowed about area of median ocellus, sulcation of costa more deeply impressed dorsad than in female; lateral facial carinae more sharply elevated than in female; eyes appreciably more prominent, and particularly cephalad, as seen from dorsum, their outline less continuous with that of fastigium, basal outline more broadly ovoid than in female, greatest breadth of outline equal to two-thirds of its depth. Antennae incomplete.

Pronotum somewhat more slender than in female, as seen from dorsum very faintly constricted between the second and third transverse sulci, greatest length of the pronotal disk equal to 1.5 times the greatest breadth across the lateral lobes caudad (as 32 to 21); cephalic margin of disk broadly arcuate, caudal margin as in female; median carina more evident on the prozona than in the female, prozona to metazona as 21 to 11.

Tegmina as in female, except that they reach nearly to the distal margin of the fourth abdominal tergite; general form, development of areas, and venation as in that sex except that the intercalary vein is more pronounced, definite, and direct, and reaches proximad to the proximal third of the tegmen; ulnar area with no clearly marked intercalated nervure. Wings with length essentially as in female. Mesosternal lobes subcontiguous; metasternal lobes broadly attingent.

Ultimate abdominal tergite with low trigonal and widely spaced but very definite furcula arms⁹⁷ which enclose the base of the central raised area of the supra-anal plate, the tergal margin between the furcula arms broadly emarginate; supra-anal plate broadly scutellate, its greatest breadth slightly more than its greatest (median) length (as 39 to 35), lateral margins subsinuate, but nearly parallel, to lateral obtuse-angulations, whence the arms of the apical margin converge to the blunted obtuse-angulate apex, the lateral angulations appreciably and nodosely reflexed dorsad, surface of plate with a moderately raised median carina over the whole length, this shallowly sulcate mesad except immediately toward the apex, this raised section flanked laterad by longitudinally concave areas, which rise laterad to the lateral borders of the plate, while slightly distad of the middle of each of these concave areas is placed transversely a rounded lappet-like plate, immediately distad of which there is a much deeper and subcircular surface impression; cerci simple, slightly longer than the supra-anal plate, evenly tapering, falcately decurving distad as seen in profile, viewed from the dorsum equally incurved, apices aciculate; subgenital plate rostrately produced meso-caudad into a distally transverse-truncate process, which is moderately depressed, and in breadth is subequal to the distance between the deep pits on the surface of the supra-anal plate, the whole dorsal length of the subgenital plate distad of the apex of the supra-anal being subequal to the median length of the latter, in profile the dorsal outline of the plate shallowly sigmoid.

Cephalic and median femora markedly inflated, their tibiae, however, no stouter than in the female. Caudal femora as in female; caudal tibiae with 8 external and 10 internal spines, these counts including the apical one; caudal metatarsi moderately deplanate.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♀, Port Curtis, Queensland, <i>type</i> (ex Sjöstedt)	31.0	6.5	11.0	17.5
♀, Bowen, Queensland, ex Sjöstedt	30.0	7.5	12.0	19.5
♀, Rannes, Queensland	35.0	6.8	11.7	20.3
♂, 13 miles SE. of Elsey Station, N.T., <i>allotype</i>	23.0	5.2	8.1	13.8

Coloration.—Dorsal surface of head, dorsum of pronotum, and most of tegmina pale salmon-buff to cream-buff, dorsum of abdomen in female light ochraceous-salmon, abdomen in male mustard yellow, sides of abdomen in female lumiere green, venter of abdomen in same sex dull buffy; post-ocular bars buckthorn brown, sharper and more decided in the male than in the

⁹⁷ These are what Sjöstedt refers to, in discussing *T. brachyptera*, as "zwei dreieckigen Prozessen" of the "letzten dorsalen Hinterleibsegmenten". The term "furcula" has for over a half-century been broadly used in acridoid literature for these appendages when present.

female, somewhat washed with olivaceous in the latter, reaching from the eye to the tegminal base, and continued as a dark line across the dorsal section of the pleura under the costal margin of the tegmina, a similarly coloured and equally broad, more ventral bar extending from the ventro-caudal border of the eyes diagonally across the genae, and more interruptedly across the ventral half of the pronotal lateral lobes and obscurely on to the pleura, this bordered dorsad toward the post-ocular bar, and separated from the latter by a cream-coloured bar, while ventrad the genal bar is similarly relieved by cream colour on the remainder of the genae and a ventral bordering of the lateral lobes, while the genal pale bar is continued upon the pleura, there being contrastingly accented by more ventral blackish areas, a remnant of the pale pronotal edging also present briefly cephalad of the insertion of the median limbs. Face, clypeus, and labrum pale salmon-buff⁹⁸ finely sprinkled with onion-skin pink; eyes shining cupreous; antennae vinaceous-tawny; pale occiput with a very weak darker pair of obscurely defined, caudad diverging lines. Metazonal disk of pronotum with the impressed punctulae pinpricked with buckthorn brown. Tegmina with marginal field washed with pale green-yellow, particularly the venation, humeral trunk conspicuously lined with buckthorn brown to prout's brown, anterior ulnar vein and touches on the intercalary one similarly but much less extensively and solidly lineate. Cephalic and median limbs and caudal femora chalcedony yellow (♂) to clear dull green-yellow, the dorsal section of the external pagina of the caudal femora adjacent to the dorso-external carina washed with buckthorn brown (♂) to greenish fuscous (♀), distad these femora being tinged with pinkish cinnamon in the female, this hardly indicated in the male, genicular lobes ventro-proximad in the male with a spot of fuscous; caudal tibiae glaucous, the flexor surface fuscous-black proximad shifting distad to the external carina alone, spines whitish glaucous, fuscous-tipped; caudal tarsi paler glaucous than the tibiae.⁹⁹

Distribution.—Eastern and central-eastern Queensland, and the interior of the northern section of the Northern Territory. The species probably is broadly distributed between these well-separated areas.

TOLGADIA BRACHYPTERA Sjöstedt

Plate 4, Figs. 41 and 42; Plate 5, Fig. 47; Plate 9, Figs. 110 and 111

Tolgadia brachyptera Sjöstedt, 1920, Ark. Zool. 12 (20): 23 [♂; Tolga¹⁰⁰ and Cedar Creek,¹⁰¹ Queensland]; Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 98, Plate 3,

⁹⁸ The female before me has the face and mouth-parts somewhat stained and darkened, but it is evident what has taken place and that the natural coloration was as in the male above described.

⁹⁹ Stål in the original description writes, "lemoribus anterioribus apice macula nulla vel obsoletissima notatis". The present material lacks any indication of these, and it is probable that their evidence is correlated with a range in tonal depth of the general pattern.

¹⁰⁰ "Fifteen miles S. of Mareeba, Atherton Tableland." (Dr. Key, 1947.)

¹⁰¹ I am unable to place this locality, which elsewhere Mjöberg, the collector, listed as in "N. Queensland". Dr. Key, at my request, has also endeavoured to place it among the various "Cedar Creeks" in Queensland, but without success.

Figs. 20 and 20a, b [amplified description but no additional localities]; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 75 [no additional information].

Nowhere has Sjöstedt indicated which of the two originally cited localities he regarded as the type locality, neither did he note which locality it was from which the specimen figured by him in 1921 came. In the absence of any original or subsequent designation by him I am here selecting the male from Tolga in the Stockholm Museum as the lectotype.

Sjöstedt's several descriptions of this species were based entirely on the coloration of the male sex. The single female before me had been preserved by liquid immersion, and while much of the pattern remains, all colour tones have been materially altered. However, I am designating it, as the first known female of the species, as the allotype, and here present an analysis of its major features.

Allotype.—♀; Kuranda,¹⁰² Queensland. May 31 to June 4, 1928 (F. N. Blanchard) (Zoological Museum of the University of Michigan).

The following features are those of obvious difference from the female of *T. infirma* already described.

Size smaller (length of body, 26.5 mm); tegmina not quite four-fifths as long as the pronotum, surface sculpture essentially the same.

Fastigium as viewed from the dorsum slightly more angulate and less broadly trigonal in outline than in *infirma*, and less strongly transverse, the median length cephalad of the cephalic border of the eyes contained but slightly more than 2.5 times in the greatest overall width of the fastigium (as 4 to 10.25), angle of the fastigial outline more narrowly rounded, impression of fastigial disk similar to but in outline slightly more rectangulate cephalo-laterad; fastigio-facial angle more subrectangulate than in *infirma*, less broadly rounded as seen in profile; frontal costa in general as in *infirma* but weakly constricted immediately dorsad of the median ocellus and with its lateral margins more subparallel ventrad; eyes as in *T. infirma*.

Pronotum with cephalic margin of disk slightly more evenly arcuate, caudal margin as in *infirma*; principal transverse sulcus nearly straight transverse; median carina subobsolete on the prozona, distinctly but shallowly marked on the metazona, prozona to metazona as 21 to 11.

Tegmina four-fifths as long as the pronotum, reaching only to the middle of the second abdominal tergite, not attinent meso-dorsad, narrowly lanceolate, their apices narrowly rounded acute, their greatest breadth contained 2.3 times in their length (as 12 to 28), principal longitudinal veins well marked, no intercalary vein evident, marginal field quite broad, equal to almost half the entire tegminal breadth. Wings evident, falling but slightly short of the tegminal apices.

¹⁰² In the Cairns region, in adjacent mountains.

External genitalia much as in the female of *infirm*a except that the apical sections of both pairs of ovipositor valves are relatively smaller and rather straighter; the lateral plates of the ventral valves have their dorsal margin much less evenly oblique to the apex, but instead broad obtuse-angulate near the middle; the lateral flanges of the distal margin of the subgenital plate are definitely acute-angulate instead of rounded subacute, while the median section of the distal margin of the subgenital plate is as a whole distinctly acute-angulate.

Caudal femora with their greatest depth contained 5.6 times in their length, genicular lobes with apices acute-angulate.

The descriptions of the male sex presented by Sjöstedt in his two descriptions of the species are entirely of colour features, all morphological features being included in his generic description, which naturally was based solely on the male of *brachyptera*, the sole species then referred to *Tolgadia*. The figures given by Sjöstedt, however, do show that the supra-anal plate of *brachyptera*, his illustration of which is here reproduced for comparison with the same parts of *T. infirma* and of which the male is before me, is very similar to that of the latter species except that the median sulcation expands much more proximad than in *infirm*a and there is no indication of the paired surface lobulations here described for the latter species; the cerci are apparently very similar, the furcula is shown as more pronounced, and while the subgenital plate has its distal production similar to what is seen in *infirm*a it is definitely longer and more attenuate. These comments, and the figures here given, will enable the student to distinguish males of the two species.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Length of Tegmen	Length of Caudal Femur	Length of Caudal Tibia
♂, ex Sjöstedt, 1920 and 1921	20-24	11-12	4.3-5.0	4.0-5.5	11.0-13.5	9.8-12.0
♀, Kuranda, Queensland, <i>allotype</i>	26.5	8.1	5.3	4.4	14.3	12.3

Coloration.—The single specimen before me, except for the most pronounced features of its dark pattern, has been completely decolourized by immersion in some liquid preservative before being pinned. In consequence it is virtually valueless for colorational features. The following colour description has been translated and condensed or amplified from Sjöstedt's more ample (1921) description of the males originally examined.

Face fuscous-red, sides of head yellow-green; broad, fuscous-brown bar extending from eyes across lateral lobes of pronotum and on the pleura, bordered ventrad by brownish white, genae with an oblique subocular bar of fuscous-brown, similarly relieved ventrad by brownish white, head and pronotum above brownish red, this on head bordered by pale lines; limbs brownish red and yellow, caudal femora externally with dorsal part narrowly and briefly barred

with fuscous, beneath before apex maculate with black; caudal tibiae pale glaucous, beneath black, tarsi brownish yellow; antennae brownish red, infusate toward apex; tegmina coloured as the pronotal dorsum, with two median veins black.

The general pattern is thus seen to be much as in the related species. The pre-apical ventral black spot on the caudal femora is but faintly evident in the specimen before me, as are the pale lateral occipital lines, while the dark ventral surface of the caudal tibiae becomes a marginal lineation distad in the specimen in hand, as this pattern does in related species. The dark lineation dorsad on the external pagina of the caudal femora extends over slightly more than half of the femoral length. The pleura of the specimen before me show the broken, dark, more ventral lineation seen in the related species.

Remarks.—This species and *campbelli*, described below, are closely related. Sjöstedt in the original description gives the date of his Tolga material as February. The present specimen extends the occurrence time period to early June.

Distribution.—At least the Atherton Tableland and elevated more coastal country toward Cairns. The exact location of Mjöberg's "Cedar Creek" cannot be determined by me,¹⁰¹ as there are a number of places so named in Queensland, several at least in the south-eastern section. However, it is referred to elsewhere by Mjöberg as "N. Queensland". Hence it is not possible to be more specific as to the possible north and south range.

*TOLGADIA CAMPBELLI*¹⁰³ n. sp.

Plate 4, Fig. 43; Plate 5, Fig. 45; Plate 9, Figs. 112 and 113

Type.—♀; Darwin, Northern Territory. March 23, 1936 (T. G. Campbell) (Division of Entomology Museum, C.S.I.R.O., Canberra).

The major differential features have been presented in the key to the species of the genus. The male sex, when known, may present additional differences from that sex of *T. brachyptera*.

Size medium (length of body, 34.5 mm); form essentially as in *T. brachyptera*.

Head with dorsal profile of occiput and fastigium as a whole more arcuate and cephalad more declivent to the well-rounded rectangulate fastigio-facial angle; fastigium as viewed from the dorsum less produced, more strongly transverse, and with its cephalic outline broadly and regularly arcuate, the greatest median length of the fastigium cephalad of the cephalic border of the eyes equal to but one-third of the greatest overall fastigial breadth (as 13 to 39), impression of fastigial disk in outline much as in *brachyptera* but more arcuate cephalad and very weakly impressed; interspace between eyes quite broad, equal to two-thirds of the fastigial breadth (as 26 to 39); eyes as seen from dorsum equal in prominence to those of *brachyptera*, as seen in profile the basal outline

¹⁰³ I take pleasure in dedicating this well-marked species to the collector of the type, Mr. T. G. Campbell.

is broader and distinctly more ovate, and less ovoid, than in *brachyptera*, more rounded both dorsad and ventrad, the greatest breadth of the outline equal to seven-tenths of its length. Antennae lacking.

Pronotum in form and general proportions, cephalic and caudal margins of disk, emphasis and character of transverse sulci, and surface sculpture as in *brachyptera*, median carina slightly more evident on prozona; lateral lobes with ventro-caudal angle more definitely rectangulate than in *brachyptera*, the caudal margin of the lobes straight vertical in its ventral third, thence dorsad oblique to the discal section, instead of suboblique as a whole as in *brachyptera*.

Tegmina reaching to the base of the second abdominal tergite, narrowly separated dorsad, broader, particularly distad, than in *brachyptera*, the greatest breadth at five-eighths of tegminal length equal to slightly more than one-half the tegminal length (as 19 to 36), instead of two-fifths as in *brachyptera*; apex of tegmina semicircularly arcuate, costal margin weakly arcuate, sutural margin more strongly arcuate, particularly proximad; marginal field subequal to half the entire tegminal breadth (as 9 to 19), principal longitudinal veins well marked, moderately elevated.

Prosternal spine erect, conical. Mesosternal lobes almost subattingent, the least interval being not more than one-tenth the breadth of one of the mesosternal lobes, the internal margins of the latter more broadly arcuate than in *brachyptera*.

Supra-anal plate more compressed and more narrowly subrostrate distad than in *brachyptera*, the apex definitely blunt acute-angulate, median sulcation proximad; cerci simple, tapering styliform; ovipositor valves as in *brachyptera*, lateral plates of ventral valves with their dorsal margin as in *brachyptera*, their apex less produced and blunt acute; subgenital plate with the lateral flanges deeper in proportion and apically well rounded subacute, instead of shallower and more sharply acute as in *brachyptera*.

Cephalic and median limbs slightly more elongate than in the female of *brachyptera*. Caudal femora more elongate and more slender than in *brachyptera*, their greatest depth equal to about one-sixth of their length (as 20 to 115), all carinae relatively low and not markedly evident, chevrons of external paginal pattern fewer and more widely spaced than in *brachyptera*, genicular lobes acute-angulate; caudal tibiae with 8 external and 10 internal spines; caudal tarsi with metatarsus moderately deplanate, sinuately impressed medio-longitudinally on dorsal surface.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♀, Darwin, N.T. (<i>type</i>)	34.5	7.0	6.0	18.7
♀, Cairns district, Queensland	31.0	7.1	6.5	18.0

Coloration.—General base colour cinnamon-buff, darkening to clay colour on the dorsum of the abdomen and chamois on the face, genae, and venter; post-ocular bars cinnamon-brown to prout's brown on head and pronotum, narrow, poorly defined dorsad, ventrad clearly so by contrast with a more ventral cream-coloured bar, this latter crossing the middle of the lateral lobes of the pronotum and continued over the pleura. Clypeus and labrum washed with rufous; face with faintest traces of a darker punctulate pattern; eyes cinnamon-brown; genae as in related species with a second post-ocular dark bar, which is also rather poorly delimited, yet clearly indicated. Tegmina of the general tone, broadly coloured longitudinally in the discoidal area with a continuation of the dark pronotal post-ocular bar. Cephalic and median limbs rather dull brownish glaucous. Caudal femora but faintly and narrowly dark lineate dorsad on external pagina ventrad of the dorso-lateral carina; caudal tibiae and tarsi pale glaucous, spines cream-coloured with fuscous tips.

Distribution.—Known from the type locality in the coastal belt of the Northern Territory, and from the Cairns district of Queensland.

Remarks.—When this species was described the type was all known to me. More recently a single female from the Cairns district of Queensland was received from the South Australian Museum, and measurements of this specimen have been given above. The very few differences of the Queensland specimen from the preceding description of the type are clearly individual, and except for the less rounded and rather sharper apex of the tegmina, are solely of coloration. The darker post-ocular bar is somewhat more contrasted on the head and pronotum, and the face between the lateral (supplementary) facial carinae is washed weakly with vinaceous and finely sprinkled with darker brown.

Specimens examined.—2; 2 ♀.

Northern Territory.—Darwin; 23.iii.1936 (T. G. Campbell) 1 ♀ (*type*) (Division of Entomology Museum, C.S.I.R.O., Canberra).

Queensland.—Cairns district; (A. M. Lea) 1 ♀ (South Australian Museum).

*TOLGADIA TORTILIS*¹⁰⁴ n. sp.

Plate 5, Figs. 48 and 49; Plate 6, Figs. 50 and 51; Plate 9, Figs. 114-118; Plate 10, Figs. 119-122

While this species in general appearance and proportions much resembles *T. cairnsensis* and *T. bivittata*, the sigmoid form of the male cerci is markedly different from these structures as found in any of the other species of the genus of which the male sex is known. In most respects it closely approaches *T. infirma*, one of the short-winged species. When compared with *T. bivittata*, as here understood, and of which the female sex alone is known, *tortilis* is in that sex somewhat more robust, with a broader head and pronotum and slightly deeper caudal femora. In the same sex the tegminal outline and venation more nearly approximate those of *cairnsensis* than they do those of *bivittata*. On account of

¹⁰⁴ i.e. *twisted*, in allusion to the shape of the male cerci.

the very distinctive male genitalia I am placing *tortilis* in an isolated position in the generic arrangement.

Type.—♂; Cairns district, Queensland (A. M. Lea) (South Australian Museum).

Size medium; form relatively slender, more so than in the same sex of *T. cairnsensis* and in this respect essentially as in the male of *T. infirma*; surface as a whole more polished than in the male of *cairnsensis*, pronotal punctulation as in the latter.

Head with greatest breadth across the eyes slightly greater than the exposed medio-dorsal length of the head (as 26 to 23), the breadth across the eyes approximately 1.2 times that across the genae as seen from the dorsum (as 26 to 22), dorsal line of head as seen in profile as in the male of *infirma*; fastigium as seen from the dorsum in proportions and in outline as in the male of *infirma*, except that the apical point of the outline is more narrowly rounded, excavation of fastigium distinct but relatively shallow, in outline, emphasis, and extent as in the same sex of *T. cairnsensis*; interocular space as in *cairnsensis*; fastigio-facial angle as seen in profile, degree of facial obliquity, and the degree of the arcuation of the interantennal section of the facial outline as in the male of *infirma*; frontal costa in outline, character, and depth of sulcation as in the male of *infirma*, but the lateral margins of the costa are slightly more convergent dorsad toward the fastigio-facial angle than in *infirma*, while the median ocellus is of the larger size found in the same sex of *infirma* and in this respect differs from *cairnsensis* in which the male has a smaller median ocellus, ventral section of the lateral carinae of the frontal costa somewhat less pronounced than in *cairnsensis* but the same as in *infirma*. Eyes relatively full and subglobose as seen from the dorsum, basal outline of eye and proportions of the same as in the male of *cairnsensis*. Antennae damaged.

Pronotum in build more slender than in the male of *cairnsensis*, in this respect as in male of *infirma*, its greatest median length but slightly more than the greatest breadth caudad across the lateral lobes (as 35 to 34), its dorsal margins as in *infirma*, median carina, proportions of prozonal and metazonal sections of the disk as in *infirma*, transverse sulci in all respects as in latter; lateral lobes with their proportions and marginal details as in *infirma*.

Tegmina fully developed but falling slightly short of the apex of the abdomen and of the apices of the caudal femora by a distance subequal to the exposed dorsal length of the head; tegminal apices much more acute than in the male of *cairnsensis*, and with the apex in its usual position and not disto-sutural as in *infirma*; intercalary vein well marked, ulnar area with a distinct medio-longitudinal nervure. Wings fully developed.

Prosternal spine conical, faintly compressed, weakly declivent. Mesosternal lobes with their margins more broadly rounded caudad than in the male of either *cairnsensis* or *infirma*, subcontiguous mesad; metasternal lobes with their caudal margins more straight oblique than in either *cairnsensis* or *infirma*, mesad contiguous in the caudal half of their length.

Ultimate abdominal tergite without furcula; supra-anal plate of the type usual in the genus, being relatively short and broad, the greatest proximal breadth equal to 1.1 times the median length (as 44 to 40), lateral margins subparallel to the caudo-lateral point of the margins, these margins in detail very slightly inbowed from their middle to the above-mentioned lateral points, distal portion of the margins broadly obtuse-angulate with the immediate angle rounded, the caudo-lateral points blunt but well marked and distinctly upcurved, surface of supra-anal plate with medio-longitudinal section but shallowly elevated, with the distad narrowing median impression of the same area very shallowly marked in the proximal two-thirds of the plate, more lateral areas of the surface shallowly excavate with the usual pair of lobiform nodes well marked but not high, and with their axes oblique and directed latero-cephalad; cerci most distinctive, evenly narrowing in diameter distad but in shape very different from those of any other species of this or related Australian genera, as seen from the dorsum being evenly incurved from the proximal third to about the distal third, whence they falcately outcurve to their apices, the general form in this view being sigmoid, in normal repose with their outcurving apices somewhat farther apart than their internal surfaces are at two-thirds of their length, as seen in profile they are nearly straight to the point where they outcurve as seen from the dorsum, with their depth evenly narrowing to the same point, distad of which in profile they are deflected nearly straight ventro-caudad at an angle of approximately 30° , apices of the cerci much surpassing that of the supra-anal plate; subgenital plate conical, distinctly produced, the distal portion regularly narrowing and with its apex, as seen from the dorsum, subtruncately rounded, dorsal surface of the apical section with a pair of shallow longitudinal impressions separated by a low median elevation.¹⁰⁵

Cephalic and median femora appreciably inflated and bullate, their dorsal outlines in profile being distinctly convex. Caudal femora with their length somewhat surpassing that of the tegmina, in profile moderately slender, their greatest depth (at proximal fifth) contained six times in their length (as 17 to 103), pattern of external pagina regular and well spaced, genicular lobes acute; caudal tibiae equal to five-sixths the length of the caudal femora (as 85 to 103), armed on external margin with 8 spines (including apical one), on internal margin with 10 similarly computed; caudal tarsi with metatarsus moderately deplanate and expanded.

Allotype.—♀; Cairns, Queensland (South Australian Museum).

Differing from the preceding description of the male sex in the following noteworthy features.

Size considerably larger (body length 32.5 mm); general form virtually as in the male but slightly more robust.

¹⁰⁵ The male type had the tip of the subgenital plate broken off accidentally, and while it has been preserved, and in the accompanying figure has been shown in outline, it is now difficult to make broad generalizations as to its undisturbed state. Unfortunately the type is the only male of the species now available.

Head with greatest breadth across the eyes subequal to the exposed medio-dorsal length of the head, the breadth across the eyes 1.1 times that across the genae as seen from the dorsum (as 31 to 31), dorsal line of head as seen in profile with the fastigial section continuing the general decurving and not as straight as in the male; fastigium as seen from the dorsum in outline greatly resembling that of the female of *T. infirma* but with the angulation slightly less rounded, while the excavation of the fastigial disk in shape is more as in the female of *T. cairnsensis* but a little more angulate cephalad, while in its depth it is more shallow with a distinct transverse impression much as in the same sex of *T. infirma*, interocular space slightly narrower than in the females of any of the compared species, being slightly less than two-thirds of the greatest fastigial breadth (as 8 to 13); fastigio-facial angle and the slope of the facial line much as in the female of *T. bivittata* and not as sharp as in *infirma*; frontal costa as in the same sex of *infirma*, not quite as broad as in *bivittata* and with its carinae less sharp and thicker than in *cairnsensis*. Eyes as seen from the dorsum quite prominent for the sex, more prominent than in the females of *infirma* or *bivittata*, more as in *cairnsensis*, basal outline essentially as in the female of *cairnsensis*. Antennae damaged.

Pronotum appreciably heavier and stouter than in the male of the species or the females of *infirma* or *bivittata*, its greatest median length equal to about 1.3 times the greatest breadth caudad across the lateral lobes (as 21 to 16), the cephalic and caudal margins of the disk as in the female of *infirma*; median carina as in the male sex but with a weaker development, proportions of prozona and metazona of disk as in the female of *infirma*, transverse sulci in contour and emphasis as those of the latter; lateral lobes proportionately shorter and deeper than in the compared species, the greatest depth ventrad from the usual position of the dorsal border of the pronotal section of the post-ocular bar being equal to five-ninths of their length at the same point (as 20 to 36), marginal details as in the male.

Tegmina as fully developed as in the male sex, falling short of the apex of the abdomen and of the apices of the caudal femora by a distance appreciably less than the exposed dorsal length of the head; tegminal details as described for the male sex.

Prosternal spine similar to but even less compressed than in the male. Mesosternal lobes more truly quadrate and with their caudal margins straighter than in the male, narrowly separated mesad.

Supra-anal plate much as in the female of *bivittata*, but as a whole more compressed and subtectate, the apex more acute, transverse impression moderately evident and laterad more sharply bent cephalo-laterad than in *bivittata*, medio-longitudinal sulcation distinctly but shallowly impressed in the proximal half, subobsolete to obsolete distad; cerci simple, tapering, falling slightly short of the apex of the supra-anal plate; infra-cercal plates subequal in length to the cerci; dorsal ovipositor valves slightly more slender and more attenuate than those of the female of *bivittata*, in profile very similar but slightly less recurved distad, ventral ovipositor valves with proximal section

more slender than in *bivittata*, in profile the distal section is more slender and less decurved, lateral plates more attenuate and more acute distad; subgenital plate much as in the same sex of *bivittata*, but lateral notch of distal margin more strongly acute emarginate, and the lateral lobule of the same margin is narrower, median impression of ventral surface of subgenital plate as in *bivittata*.

Cephalic and median femora much less inflated and more slender than in the male of the species, essentially as in the female of *bivittata* in this respect. Caudal femora with proportions and sculpture as in the male; caudal tibiae with 9 or 10 external spines (including apical one) and 10 internal ones; caudal tarsi as in the male.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂, Cairns district, Queensland, <i>type</i>	27.3	6.0	16.9	15.8
♀, Cairns, Queensland, <i>allotype</i>	32.5	7.0	21.0	23.1

Coloration.—In the two specimens of the species before me the pattern is strongly marked and conspicuous in the male (type) and strongly recessive and only weakly or partially indicated in the female (allotype). In consequence the base pattern of the male is described and that of the female is compared with that of the other sex. Male with dark post-ocular bars extending from the eyes across the post-ocular part of the head, over the dorsal section of the lateral lobes to the bases of the tegmina and narrowly indicated across the pleura where touched by the proximal section of the costal margin of the closed tegmina; another dark bar extends from the ventral section of the eyes across the genae, the ventral section of the lateral lobes of the pronotum, and more obscurely across the ventral portion of the pleura to the insertion of the caudal femora, and between these two dark bars is indicated continuously a pale bar reaching from the eyes to dorsad of the caudal femoral insertion. Base colour of the dorsal surface of the head, pronotum, and anal field of tegmina in male ranging from clay colour (on head) to pinkish buff on the tegmina, paired post-ocular bars prout's brown, pale intermediate bar cream colour, face, clypeus, and labrum russet, eyes ochraceous-tawny; pronotum with ventral cingulate border lined with cream colour; tegmina with marginal and discoidal fields lightly washed with tawny, elements of the humeral trunk, the intercalary vein, and the proximal half of the ulnar vein pencilled with prout's brown; ventral surface light brownish olive passing to honey yellow on the abdomen (all surfaces); cephalic and median femora light yellowish olive, the tibiae nearer tawny-olive; caudal femora with base colour lime green washed with pinkish cinnamon distad, external face marked in proximal half with prout's brown dorsad against the dorso-external carina; caudal tibiae pale brownish

glaucous, flexor surface marked with prout's brown, this weakening distad, spines cream colour, dark-tipped. In the female the dark post-ocular bars are largely obsolete, the ventral section of the more dorsal one being all that is clearly marked, and this largely on the lateral lobes of the pronotum, while the face, clypeus, and labrum are tones of the general colour, the tegmina show no pronounced lineation, the caudal femora have but little in the way of contrasting dark area, and the whole coloration is little contrasted and much more uniform. The general tone of the female ranges from clay colour to olive-ochre, the eyes are as in the male, the face nearly uniform honey yellow, but faint bluish clouds are evident in the areas where post-ocular dark bars are present in the male, the cephalic and median limbs are less greenish and more of the general tone, and the abdomen is essentially as in the male.¹⁰⁶

Remarks.—While this species shows marked affinity in many features to other members of the genus, the very distinctive and unusual character of the male cerci accord it a position well removed from the others. There is no reason to regard these structures as other than normal developments, as virtual parallels exist in other genera of the acridoids. The position of the species from female material is much less easy to determine as in this case there is a combination of features which prohibit its close association with any of those which it approaches in some one or another feature. More material, and of both sexes, is needed to determine whether certain of the apparent differences are basic or, other than cercal ones, could be covered by individual or population variation.

Distribution.—Known only from the Cairns district of coastal northern Queensland.

Specimens examined.—2; 1 ♂, 1 ♀.

Queensland.—Cairns district; (A. M. Lea) 1 ♂ (*type*) (South Australian Museum). Cairns; 1 ♀ (*allotype*) (South Australian Museum).

Genus *BERMIODES* I. Bolívar

Bermiodes I. Bolívar, 1912, Trab. Mus. Cienc. Nat., Madr., No. 6: 50; I. Bolívar, 1918, Trab. Mus. Cienc. Nat., Madr., No. 34: 11, 28; Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 81, 99; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 60, 75.

Austroglyphus Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 84, 99; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 60, 75.

Genotype (by monotypy) *Bermiodes nigro-bivittatus* I. Bolívar.

A very careful analysis of the available information on *Bermiodes* and *Austroglyphus* leaves no course open but to establish the above synonymy. I. Bolívar's *Bermiodes* and *B. nigro-vittatus* were based on a male, apparently unique, from northern Queensland, now in the Madrid collection. This individual was fully described by Bolívar, and the type specimen, loaned by

¹⁰⁶ The female allotype does not seem to have had its coloration seriously altered by desiccation, and in my opinion it shows intra-specific variation in pattern strength, a range to which the author long ago applied the terms "intensive" and "recessive", to indicate factually an intensity range of pattern, entirely aside from any possible genetic explanation.

him, was figured by Sjöstedt in 1921.¹⁰⁷ As far as is now known no other material has been referred to this genus or species in published literature. Sjöstedt's *Austroglyphus* and *A. roseivittatus* were based on a single female taken on Thursday Island in Torres Strait, on the voyage of H.M.S. *Alert*, which specimen is now in the British Museum (Natural History). This latter individual was well figured by its describer.¹⁰⁸

The basic feature given by Sjöstedt to distinguish his *Austroglyphus* from *Bermiodes* was that the prosternal process in the former was appreciably compressed, and toward the base narrowed to some degree, while in *Bermiodes* this structure was said to be stout, cylindrical, obtuse, and subcompressed anteriorly posteriorly. As a secondary feature the antennae were said to be one and one-half times as long as the head and pronotum together in *Bermiodes*, and subequal to the pronotum in *Austroglyphus*. The latter may, of course, be a purely sexual difference, as the genera were based on individuals of opposite sexes.^{108a} Further, from the descriptions and illustrations of the types the most obvious difference, other than certain clearly sexual ones such as the greater bulk and robustness of *Austroglyphus*, was the marked lobation of the proximal portion of the marginal field of the tegmina in that genus. It is evident from what we now know of numerous other genera of the Oxyini that this marked lobation is a feature found only in the female sex of a number of these, such as *Oxya*, *Berminus*, *Bermiella*, *Hieroglyphus*, and *Parahieroglyphus*, to mention a few. In consequence the marked marginal lobation of *Austroglyphus*, when considered with correlated information here presented, expresses a purely sexual, and not a generic, difference. This conclusion is supported by female individuals examined since the above was written.

Regarding the apparent discrepancy in the prosternal spine development as drawn from the relevant literature, this conceivably could be due to the method of preservation of the specimens examined, as the latter have been so few, probably not all in the best state of preservation. When this possibility is considered, with evidence here given under *Bermiodes nigro-bivittatus*, I feel warranted in regarding the differences stressed by Sjöstedt as merely sexual, or due to individual variation or preservation conditions, and that instead of two genera and two species there is but a single genus and species.

*Generic features.*¹⁰⁹—Body relatively slender (♂) to moderately robust (♀), fully alate in both sexes. Head subequal in breadth to pronotum, more robust and thicker in ♀ than in ♂; fastigium angulate produced, in length not exceeding breadth of interocular space, which latter is slightly greater than length of proximal antennal article, fastigial margins, as seen from dorsum, linearly convergent cephalad to the rounded apex, disk of fastigium shallowly

¹⁰⁷ Kungl. Svenska Vetenskapsakad. Handl. 62 (3): Plate 3, Fig. 21 (1921).

¹⁰⁸ Kungl. Svenska Vetenskapsakad. Handl. 62 (3): Plate 3, Fig. 22 (1921).

^{108a} Since the above was written, I have been able to examine female specimens, which have the perfect antennae definitely longer than the pronotum. I would imagine that the apices of the antennae in the unique type of *Austroglyphus roseivittatus* had been damaged.

¹⁰⁹ Those drawn from the female sex have largely been taken from Sjöstedt.

impressed within cephalic margins, well defined caudad from occipital surface, fastigio-facial angle as seen in profile slightly broader than a right angle; face in profile distinctly declivent; frontal costa continuously sulcate from fastigio-facial angle to supra-clypeal suture, more deeply and triangularly so in cross section dorsad than ventrad of the median ocellus, borders of costa diverging from basal angle to interantennal area thence ventrad of the median ocellus this tendency is more faintly but regularly continued; lateral facial carinae well marked, arcuate about antennal bases, thence ventrad subarcuately diverging. Antennae in ♂ and ♀ elongate, reaching, when extended caudad, nearly (♀) or quite (♂) to base of caudal femora, and in length equal (♀) to or 1.5 (♂) times the combined length of the head and pronotum^{109a}. Pronotum sub-cylindrical, broader, and more incrassate in ♀ than in ♂, somewhat deplanate dorsad in ♂, weakly (♂) or distinctly (♀) expanding over the lobes ventro-caudad as seen from dorsum; cephalic margin of disk low arcuate in ♂, caudal margin of disk obtuse-angulate; surface of dorsum of metazona and immediately cephalic section of prozona closely impresso-punctate, the remainder of dorsum not punctate (♀) or with fewer and more widely spaced punctations (♂), prozona about one and one-third times as long as metazona, transverse sulci deeply impressed, their emphasis as usual in the Oxyini, i.e. the intra-marginal one marked only on lateral lobes, the first lacking on the lateral lobes, the second continued more ventrad on the lateral lobes than the third (or principal one), median carina obsolete or subobsolete on the prozona, low but evident on the metazona; lateral lobes longer than deep, their cephalic margin oblique subrect, ventro-cephalic angle rounded, obtuse, ventral margin sinuately broad obtuse-angulate, the production being a median arcuate sublobation, ventro-caudal angle slightly produced rounded rectangulate, caudal margin subvertical and appreciably concave, ventral and at least part of caudal margins rather strongly cingulate, surface of lobes with sulci deeply engraved, the area ventrad and caudad of the second sulcus distinctly impressed as contrasted with the surface immediately dorsad of same area, humeral section of lateral lobes cephalad of principal sulcus with two longitudinally disposed subcircular glabrous areas marked off from the surrounding surface, as seen from dorsum in the ♀ the lateral lobes are more strongly outbowed than in the ♂. Tegmina somewhat surpassing the apices of the caudal femora,¹¹⁰ narrow and distinctly lanceolate in ♂, with distal portion of costal margin evenly arcuate to the rounded acute apex which is near the usual line of the sutural margin, the latter even faintly concave distad, marginal field in ♂ very shallowly expanded proximad, in ♀ the tegmina are broader, with the proximal third of marginal field rather strongly and sharply arcuate lobate expanded; intercalary vein

^{109a} Female material with perfect antennae, received since this manuscript was originally prepared, gives information modifying Sjöstedt's statement that in the female the antennae equal the pronotal length. See preceding comment.

¹¹⁰ Apices probably damaged in the sole female known to Sjöstedt. Complete in those recently made available to me.

in ♂ fully developed, extending to the sutural margin of the tegmina,¹¹¹ present but less regular in the ♀. Wings elongate, narrow, their greatest breadth in ♂ contained nearly 2.75 times in their length, apex very narrowly rounded acute. Prosternal process rather stout, linguiform, moderately compressed transversely, its apical margin transverse subarcuate,¹¹² its distal section sub-bulbous, the base subconstricted transversely; interspace between mesosternal lobes in ♂ half as broad as long, mesosternal lobes as broad as deep, in ♀ the lobes are more broadly separated with the interspace expanding caudad; metasternal lobes subattingent caudad in ♂, in ♀ widely distant. Male with ultimate abdominal tergite lacking furcula; supra-anal plate trigonal in outline, appreciably tectate in cross section, its surface bearing a medio-longitudinal subsulcate section, this transversely divided into narrower proximal and broader distal halves, lateral section concavely declivent, apex acute; cerci relatively short, not surpassing apex of supra-anal plate, nearly straight, styliiform but more sharply acuminate in distal third; subgenital plate short, briefly acuminate with an upcurved moderately sharp tubercle dorso-distad. Cephalic and median femora of male slightly inflated. Caudal femora with carinae entire, dorsal one with a small but distinct supra-genicular spine, lateral sections of dorso-distal extremity of caudal femora rounded, genicular lobes acute-angulate distad; caudal tibiae with no lamellation of the lateral margins of the extensor surface, which latter is in no way concave, extensor margins with 8-10 spines,¹¹³ external tibial spurs shorter than internal ones and the two subequal in length, while of the internal pair the extensor one is appreciably longer than the flexor; caudal metatarsi moderately deplanate, subequal in length to the third article, tarsal claws subequal in length, arolium well developed. Ventral surface of more distal abdominal sternites with paired patches of bristly hairs.

Remarks.—The relationship of *Bermiodes* and *Daperria* is very close, and it is conceivable that the latter may be found inseparable from *Bermiodes* when more material has been examined. Apropos of this the student is referred to comments made below under *Daperria*. The genus *Bermiodes*, however, is a well-characterized and distinctive one in relation to all the other Australian members of the Oxyini.

Distribution.—Groote Eylandt, Northern Territory, northern Queensland and islands in adjacent Torres Strait (i.e. Thursday and Banks Islands). How far southward in Queensland this genus extends is not known, as no exact Queensland locality has been cited.

¹¹¹ In one of the two males seen this vein is broken for the breadth of a single areolet at about three-fourths of its length, but is complete in the other.

¹¹² From available material this margin varies appreciably in its exact degree of curvature.

¹¹³ Sjöstedt gives 10 for both margins in the female; the single specimen before me with caudal limbs (♂) has 8-9 external and 10 internal spines. Females now before me have 9 external and 10 internal spines.

BERMIODES NIGRO-BIVITTATUS I. Bolívar

Plate 6, Figs. 52 and 53; Plate 10, Figs. 123-126

Bermiodes nigro-bivittatus I. Bolívar, 1912, Trab. Mus. Cienc. Nat., Madr., No. 6: 51 [♂; northern Queensland]; I. Bolívar, 1918, Trab. Mus. Cienc. Nat., Madr., Ser. Zool. No. 34: 28 [no additional information]; Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 99, Plate 3, Fig. 21 [type figured, comments but no additional localities given]; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 75 [no additional information].
Austroglyphus roseivittatus Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 100, Plate 3, Fig. 22 [♀; Thursday Island, [off] Cape York, Torres Strait]; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 75 [no additional information].

Northern Territory.—Umba Kumba, Groote Eylandt; 28.vi. and 1-5.vii.1948 (R. R. Miller, one labelled "nightlight on sand dune ridge") 2 ♀ (United States National Museum and Academy of Natural Sciences of Philadelphia).

Queensland.—Banks Island; 1910 (Elgner) 2 ♂ (Division of Entomology, C.S.I.R.O., Canberra, and United States National Museum).

The four specimens of this little-known genus and species now before me show certain differences, but after full allowance has been made for these it is clear that they represent individuals of the same species. Unfortunately the male belonging to the Canberra series lacks antennae and one median and both caudal limbs, the apex of the abdomen has been damaged, and it has also suffered markedly from mould. The Banks Island male individual from the United States National Museum, however, is perfect except that it lacks one antenna and the cerci are damaged. The two Groote Eylandt females have been dried from wet preservative, are somewhat shrivelled, and the colour tones have been destroyed, but they clearly represent this species. As the measurements given below show, the first-mentioned Banks Island specimen is somewhat the larger and its coloration is less well preserved than in the other individual. The fastigium as seen from the dorsum in the first-listed is slightly broader at its widest point than its length cephalad of the least interocular space (as 38 to 30), while in the other specimen the fastigial breadth is virtually 1.6 times the fastigial length similarly measured (as 39 to 25). In general outline the fastigium in the former, similarly viewed, is moderately acute angulate with the immediate angle well rounded, while in the second specimen it is rectangulate with the arms faintly concave, and the immediate apex is somewhat more narrowly rounded. In both, however, the fastigial disk is very shallowly excavate except caudad, being slightly more deeply impressed where it joins the swell of the occiput. In profile the fastigio-facial angle is a shade more sharply angulate in the first-mentioned specimen than in the other. I regard these differences as purely individual, such as are frequently encountered in many species in material from the same locality.

The following features of the male sex, additional to those given under the genus or discussed above, have been drawn from the better-preserved male, which also is here figured.

Distal margin of ultimate abdominal tergite with no trace of furcula. Supra-anal plate with greatest proximal breadth equal to four-fifths of median

length, lateral margins subarcuately converging to distal fourth, which is more acutely produced into the apical section, which latter extends as far distad as the apices of the infra-cercal plates, median sulcation of plate with the cariniform margins of the narrower proximal section sinuately converging to the low cariniform transverse truncate division of the sulcate area, the distal half of which latter is much broader than the proximal half, with its cariniform lateral borders sigmoid, first well diverging then moderately arcuate convergent to near their juncture with the lateral margins where they again weakly diverge to their coalescence with the latter, excavation of the surface of the broad declivent lateral sections of the plate well marked and concave; cerci with distal third acuminate and much more sharply narrowing than the nearly subequal proximal two-thirds, as seen in profile the acuminate distal third is very slightly decurving, while from the dorsum the same section is very faintly outcurved; infra-cercal plates triangularly acuminate, their surface moderately excavate; subgenital plate while short with its subpyramidical form culminating in the short but marked apical tubercle, which is moderately acuminate and elevated appreciably dorso-distad of the lateral sections of the dorsal margins of the plate.

The following notes are drawn from the more perfect of the two Umba Kumba, Groote Eylandt, females, i.e. the one belonging to the United States National Museum, and are chiefly of differences from the male sex, or from Sjöstedt's description of the female as presented in his description of the genus *Austroglyphus*.

Size more robust, body broader and deeper.

Fastigium, as seen from dorsum, transverse, its length cephalad of the eyes hardly more than half of its greatest breadth (as 8 to 15), its cephalic margin arcuate, not sharply cut off from the frontal costa, but with its cephalic border well defined laterad of the costal juncture, impression of fastigial disk transverse arcuate, well defined caudad from interocular space, latter slightly broader than two-thirds of the greatest fastigial breadth (as 11 to 15), fastigial facial angle as seen in profile slightly more broadly rounded than in male; frontal costa proportionately broader than in ♂, with its sulcation as strongly marked but more concavely excavate; lateral facial carinae as in male.

Pronotum as in ♂ but broader and as seen from the dorsum with the lateral lobes regularly diverging ventro-caudad, greatest breadth across lateral lobes ventro-caudad subequal to, or slightly greater than, the median length of the pronotal disk; caudal margin of disk broadly obtuse-angulate with the immediate angle well rounded; lateral lobes as viewed in profile with the surface of the ventral half of the metazonal section and of the adjacent section of the prozona appreciably concave and with its ventral border, i.e. the cingulate ventral margin of the lobes, definitely outcurved laterad.^{113a}

^{113a} This condition may be exaggerated somewhat from that of nature by contraction in drying after immersion in liquid preservative, but it is evident that any change has been only in degree of emphasis.

Tegmina surpassing the apices of the caudal femora by a distance subequal to half the pronotal length, apices as in the male sex but somewhat broader; marginal field with the lobation of its proximal third proportionately much broader, more strongly arcuate, and more sharply differentiated from the straight more distal section of the same margin, in greatest breadth the proximal lobation of the marginal field is slightly more than that of the evident portion of the anal field of the tegmina.

Supra-anal plate trigonal in outline, slightly longer than the greatest proximal breadth, medio-longitudinal impression well marked, transverse carinula arcuate and distinct; cerci conically tapering, short; ventral ovipositor valves with distal portion rather compressed as seen from venter, external margin of same with a well-marked proximal tooth, from which extends across the ventral surface of the valve a carinate ridge, in profile the ventral valves are attenuately sub-falciform decurved; subgenital plate with distal margin very broadly obtuse-angulate with a low median point.

Prosternal process broader and more transverse than in the male, the outline of its apex transversely less strongly arcuate, very weakly narrower transversely near base.

Caudal femora slightly deeper proportionately than in the male, their greatest depth contained 4.9 times in their length.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂					
Northern Queensland, <i>type</i> (ex Bolívar)	34.0	23.0	7.8	27.0	19.0
Banks Island, Torres Strait (Div. Ent. Mus., C.S.I.R.O.)	38.5	— ¹¹⁴	9.1	33.4	— ¹¹⁴
Banks Island, Torres Strait (U.S. Nat. Mus.)	35.5	21.1	7.8	31.1	21.1
♀					
Thursday Island, Torres Strait, <i>type</i> of <i>Austroglyphus rosei-vittatus</i> Sjöstedt (ex Sjöstedt)	44.0	— ¹¹⁵	10.5	c.40.0 ¹¹⁶	25.0
Umba Kumba, Groote Eylandt, N.T.	39.0	15.7	8.5	31.0	21.5
Umba Kumba, Groote Eylandt, N.T.	38.0	14.2	8.2	—	20.0

¹¹⁴ Lacking.

¹¹⁵ No measurement is given of this but the figure, which is said to be of natural size, shows them as approximately 12 mm long.

¹¹⁶ Apex is damaged, so author gave "circa".

Coloration.—The specimen described above and here figured has its coloration unaltered, while the other one has suffered greatly in this respect, hence the following notes have been drawn entirely from the male described above.

Pale base colour of head, pronotum, and pleura clear dull green-yellow (of Ridgway) becoming nearer chamois on the cephalic and median and wax yellow on the caudal femora; post-ocular bars extending from eyes across genae, dorsal section of lateral lobes of the pronotum and over pleura to tympana blackish fuscous, paling somewhat on the metazonal section of the lateral lobes. Fastigial carinate margins weakly pencilled with dark; eyes cupreous brown; antennae liver brown, darkening distad, proximal article of the pale colour of the head, distal border of each dark article except near antennal apex very narrowly pale-edged. Pronotum with dorsal border of dark post-ocular bars on prozona, bordered, in the usual position of lateral carinae when these are present, with dull apricot buff, while a similar pale ventral border, but nearer cinnamon-buff in tone, edges the dark post-ocular bar in that direction, this crossed by the clearly pencilled fuscous-black of the transverse sulci, a narrow second lineation longitudinally crossing the lateral lobes and reaching caudad to the second transverse sulcus, this joining the dark pencillings of the intra-marginal and the second sulcus and bisecting the pale part of that section of the prozona, ventral section of the lateral lobes caudad of the second transverse sulcus yellowish olive. Tegmina largely hyaline with the venation of the marginal and discoidal fields pencilled with snuff brown, of the anal field clay colour. Wings hyaline with venation pencilled in snuff brown to bistre. Ventral surface olive-buff. Cephalic and median tibiae washed with brownish olive. Caudal femora with genicular arches and a spot proximad on the external and involving more than the proximal half of the internal genicular lobes fuscous-black, remainder of genicular lobes dull cream colour; caudal tibiae glaucous, sharply blackish proximad and infusate distad, spines whitish at base and black tipped; caudal tarsi paler glaucous.

Distribution.—This has been given under the genus.

Genus DAPERRIA Sjöstedt

Genotype (by monotypy) *Daperria bermioides* Sjöstedt.

Daperria Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 84, 100; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 60, 75.

I am by no means convinced that the present genus is valid, and more material may show that it is composed of somewhat aberrant members of the genus *Bermiodes*, to which it is in any event very closely related. The chief feature which can be drawn from the literature and from the single available specimen to warrant its recognition is the constricted base of the compressed prosternal spine, and this may be found, when more material is available, to be of only specific value. The fastigio-facial angle, in profile, is more rounded than in the same sex of *Bermiodes*, also there is much less cingulation of the ventral margin of the lateral lobes of the pronotum and no definite emargination of the caudal

margin of the same lobes. In all of these, however, we may also be dealing with purely specific features. In consequence the use here of *Daperria* as a valid genus is purely tentative.

Generic features.—General form as in *Bermiodes*, fully alate in both sexes. Fastigium in ♂ angulate as seen from dorsum, more arcuate in outline in ♀, disk moderately impressed, fastigio-facial angle as seen in profile more rounded than in *Bermiodes*, face in profile distinctly declivent; frontal costa (in *accola*) as described for *Bermiodes* or (in *Bermiodes*) base above antennae rather flattened; lateral facial carinae as in *Bermiodes*. Antennae in both sexes slightly more than 1.5 times the length of the head and pronotum combined. Pronotum similar to but more slender than in *Bermiodes*, transverse sulci very deeply, more openly, and less fissately impressed than in *Bermiodes*, in pattern as in that genus; sculpture of pronotum as in *Bermiodes* but the surface of discal areas between the cephalic punctulate area and the principal transverse sulcus smoother and almost lacking punctulae; lateral lobes with sculpture as in *Bermiodes*, ventro-caudal angle not produced, narrowly rounded, caudal margin of lateral lobes in greater part vertically straight until it rounds into the caudal margin of the disk, not at all concave-emarginate. Tegmina reaching to or surpassing the apices of the caudal femora, of the same general pattern as in *Bermiodes*. Wings as in latter. Prosternal process transversely compressed, constricted at base with this more evident in the ♂ than in the ♀, sub-bulbous at apex and there low arcuate in transverse outline;¹¹⁷ mesosternal lobes contiguous in ♂¹¹⁸ or somewhat distant in ♀, the interval between the same in ♀ oblong and somewhat clepsydriiform, greatly ampliate caudad; metasternal lobes contiguous in ♂, somewhat distant in ♀. Male with ultimate abdominal tergite with very weak low and very broad lobations in the usual position of a furcula when the latter is present; supra-anal plate of male elongate trigonal, acute at apex, medio-longitudinal sulcation divided into two sections as in *Bermiodes*; cerci and subgenital plate of male essentially as in *Bermiodes*, but latter with apical tubercle more terminal and less recurved. Limbs essentially as in *Bermiodes*; caudal femora having dorsal carina with a very short spiniform production distad, dorso-distal lateral points of femora rounded, genicular lobes acute; caudal tibiae with 9-10 external and 10 internal spines, lateral margins of extensor surface non-lamellate; caudal tarsi with metatarsus slightly shorter than third article, tarsal claws subequal in length, arolium well developed. Ventral surface of more distal abdominal sternites with paired patches of bristly hairs.

Distribution.—Northern Territory and the Kimberley district of Western Australia.

¹¹⁷ Sjöstedt describes this as "apex truncatum, angulis rotundatis". My wording above conveys more correctly what is shown by *D. accola*.

¹¹⁸ The single available specimen of the genus is a male, but the mesosternal area has been destroyed when the specimen was pinned, so the above is taken directly from Sjöstedt's description of the genus.

KEY TO THE SPECIES OF DAPERRIA

Size smaller (length of body, ♂, 22 mm; ♀, 27). Frontal costa of ♂ rather flattened dorsad of antennal bases. Pronotum with caudal margin of disk broadly curved. Tegmina reaching or narrowly surpassing the apices of the caudal femora. (Coastal Northern Territory.) . . . *bermioides* Sjöstedt

Size larger (length of body, ♂, 29.5 mm). Frontal costa of ♂ continuously sulcate to juncture with fastigium. Pronotum with caudal margin of disk obtuse-angulate with the angle broadly rounded. Tegmina surpassing apices of caudal femora by a distance subequal to the pronotal length. (Kimberley district of Western Australia) *accola* n. sp.

DAPERRIA BERMIOIDES Sjöstedt

Dapperia bermioides Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 101 [♂, ♀; Darwin, Northern Territory]; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 75 [no additional information].

This species is known only from Sjöstedt's original material, consisting of a male and a female from Darwin, contained in the Stockholm Museum. Of these the male can properly be selected as the lectotype. As *bermioides* is known solely from the literature, the characters used for it in the preceding key to the species of the genus have been drawn in their entirety from Sjöstedt's original description. The latter, freely translated, is as follows:

♂, ♀: Yellowish testaceous, broad brownish post-ocular bar produced over pronotum and sides of thorax, bordered below with white; frontal costa sometimes punctate with reddish; antennae brown, base and apex lightly tinted with yellow, articles narrowly yellow at their apices; [genicular] arc, large maculation at base of genicular lobes and base of the caudal tibiae blackish brown; caudal tibiae distinctly infusate at apex; tegmina hyaline with brown veins, marginal field with ampliate part [in female] and axillary field yellowish testaceous or at least very pale, nervures very crowded; wings hyaline with brownish nervures.

♂: Length with tegmen, 25 mm; body, 22; pronotum, 4; tegmen, 17; caudal femur, 13; caudal tibia, 11.

♀: Length with tegmen, 30 mm; body, 27; antenna, 15; pronotum, 6.8; tegmen, 21; caudal femur, 18; caudal tibia, 14.

Distribution.—Known only from the Darwin area of the Northern Territory.

DAPERRIA ACCOLA¹¹⁹ n. sp.

Plate 10, Figs. 127-130

This species is distinct from but apparently close to *D. bermioides*, the genotype, but with our knowledge of the latter based entirely on its original description one can emphasize only the more evident points of difference. These are the larger size of *accola*, the frontal costa of the male continuously sulcate

¹¹⁹ i.e. a neighbour.

instead of being subdeplanate dorsad of the antennae, the obtuse-angulate caudal margin of the pronotal disk, and the longer alar organs, which latter exceed the apices of the caudal femora by a distance subequal to the pronotal length. Of the present species but a single individual is known; this is a male which has been dried after immersion in a liquid preservative, and hence its coloration has been greatly altered.

Type.—♂; Sir Graham Moore Island,¹²⁰ Western Australia. February 25, 1945 (B. Malkin) (United States National Museum).

Fastigium as seen from dorsum obtuse-angulate in outline, the greatest breadth virtually twice the fastigial length cephalad of the eyes (as 31 to 16), the immediate apex, where it passes ventrad into the frontal costa, rounded, disk of fastigium more deeply impressed immediately between the eyes than is the case with the more cephalic portion of the discal surface, the interocular portion bounded laterad by raised and subparallel borders; occiput in profile well arcuate longitudinally, evenly descending cephalad to the moderately well-rounded fastigio-facial angle; frontal costa sulcate throughout, more shallowly so ventrad than in the dorsal two-thirds, the sulcation deeper and more decided from the median ocellus dorsad all the way to the fastigio-facial angle, lateral bounding carinae of the sulcus evenly diverging ventrad to between the antennal bases, then subparallel to the median ocellus and finally faintly diverging thence ventrad; lateral facial carinae quite sharply elevated, sinuato-arcuate about antennal bases, thence from the level of the median ocellus strongly and straight divergent ventrad. Eyes moderately prominent as seen from dorsum, ovate in basal outline, faintly sharper dorsad than ventrad, greatest breadth of outline to greatest length of same as 13 to 19. Antennae elongate, extended caudad reaching much distad of the base of the caudal femora, their length almost equal to 1.6 times the combined length of the head and pronotum.

Pronotum with greatest breadth across lateral lobes caudad contained slightly more than 1.2 times in the greatest length of the pronotal disk (as 34 to 42); cephalic margin of disk evenly and moderately arcuate, caudal margin of same broadly obtuse-angulate, with the immediate apex rounded and the lateral sections of the margins almost imperceptibly concave; transverse sulci broadly engraved as with a gouge rather than narrowly etched, their position and relation essentially as in *Bermiodes*; median carinulae shallowly evident cephalad on the prozona and also on the metazona, obsolete between; lateral lobes with ventral margin very broadly and shallowly obtuse-angulate, the component sections of this margin each virtually straight.

Tegmina surpassing the apices of the caudal femora by a distance but slightly less than the pronotal length; expansion of the marginal field at proximal fourth exceedingly slight, intercalary vein well marked and continuously indicated distad, there arcuately curving toward sutural margin; tegminal apex narrowly rounded. Prosternal process with the bulbous character of the distal section

¹²⁰ Situated at the entrance to Napier Broome Bay, south-east of Cape Talbot, Kimberley district of Western Australia. Approximate position, 13° 50' S., 126° 35' E.

well marked as well as the proximal constriction, the distal margin transversely low arcuate with the disto-lateral points rounded obtuse; mesosternum damaged in type; metasternal lobes attinent caudad of the triangular foveolar area.

Ultimate abdominal tergite with very faint lobations in the usual position of furcula; supra-anal plate elongate-trigonal, its median length equal to 1.3 times its proximal breadth (as 46 to 35), apex sharply acute, converging lateral sections of the margin straight oblique from the juxta-cercal section, median longitudinal sulcate section elevated, subequal in breadth with well-defined lateral largely carinate borders, which, however, are somewhat interrupted and inbowed towards the middle, surface of sulcate area shallowly excavate proximad, more deeply so distad, the continuity interrupted towards the middle, the sub-concave surface of the declivent lateral areas well cut off from the median one, this most decided distad; cerci reaching as far distad as apex of supra-anal plate, tapering, proximal two-thirds appreciably stouter than the distinctly more attenuate distal third, which is very faintly deflected laterad of the more proximal axis, as seen in profile the distal third is also somewhat decurved; subgenital plate subconical, apical tubercle terminal and not appreciably curved dorsad, its dorsal base narrowly distad of the apices of the infra-cercal plates, dorso-lateral margins of the subgenital plate straight as seen in profile.

Caudal femora with their apices slightly surpassing that of the abdomen.

Length of body, 29.5 mm; length of antenna, 18.0; length of pronotum, 6.6; length of tegmen, 28.0; length of caudal femur, 17.7.

Coloration.—The unique type of *accola* has had its natural coloration so greatly altered by a preservative medium that little of value can be drawn from it. The caudal tibiae are glaucous, with their spines and the tibial spurs black-tipped and pale proximad, while the genicular arches of the caudal femora have remaining a blackish spot mesad, while on the proximo-ventral section of the margin of the genicular lobes there is a similar small black spot, and most of the proximal extremity of the caudal tibiae, and more particularly on the internal face, is also blackish. The deeply impressed transverse sulci of the pronotum are not lined dorsad, but much of their extent on the lateral lobes is blackish lined, although the normally dark-coloured post-ocular bars have lost virtually all their pigmentation except on the pleura, there largely under the tegmina. The antennae distad of the proximal article are pale pinkish, this doubtless much more marked in well-preserved material.

Remarks.—The type of this species is unique.

Genus THEOMOLPUS I. Bolívar

Theomolpus I. Bolívar, 1918, Trab. Mus. Cienc. Nat., Madr., No. 34: 12, 36; Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 84, 101; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 60, 75.

Genotype (by monotypy) *Theomolpus badius* I. Bolívar.

The present placement of this genus is purely tentative, as only the female sex is known, and the available material is damaged and hence incomplete.

The genus was placed in the present assemblage by I. Bolívar when originally described, but apparently it exhibits numerous discordances, and no critical comparison of it with possible relatives has ever been made. In consequence its association with the Oxyini remains on a provisional basis.

One of the distinctive features of *Theomolpus* is the form of the prosternal process, which is expanded, transverse, and greatly constricted at the base, with the diverging disto-lateral angles roundly produced, and the distal margin between concavely emarginate. This type of structure is shared with or approached in a number of other genera of Indo-Malayan and Papuan distribution, but all of these show other marked features of difference which in various ways discount the basic similarity of the prosternal development. There appears to be more similarity to the Indo-Malayan and Papuan genus *Chitaura* than to any other, but numerous features of difference in fastigial and facial development are there apparent, hence without both sexes and more material for study no definite conclusions can be presented. The present genus, however, is so sharply marked off in a number of features from other Australian genera that there should be no difficulty in its recognition. The genotypic species alone is known.

*Generic features.*¹²¹—Female sex alone known. Body moderately compressed, rather elongate. Head somewhat shorter than the pronotum, its greatest breadth across genae subequal to its length; eyes not at all protuberant, their basal outline oblique truncate cephalad; fastigium briefly and roundly produced as seen from dorsum, its greatest breadth equal to over twice its length cephalad of eyes, disk of fastigium transversely, briefly, and shallowly excavate; fastigio-facial angle as seen in profile well rounded, the fastigial line arcuately passing into that of the face, the latter markedly oblique, shallowly convex; frontal costa narrower than dorsal interocular space, subequal in breadth to below median ocellus, thence ventrad faintly widening and then becoming obsolete before the supra-clypeal suture is reached, surface of frontal costa shallowly sulcate for a short distance dorsad and ventrad of the median ocellus, plane but moderately punctate dorsad and ventrad of the sulcate section; surface of face smooth; lateral facial carinae as a whole regularly arcuate divergent ventrad; antennae in ♀ filiform, extended caudad briefly surpassing the caudal margin of the pronotum.¹²² Pronotum subcylindrical, cephalic margin of disk arcuato-truncate, caudal margin of disk obtuse-angulate emarginate mesad, surface of subequal medio-longitudinal section of disk and the greater part of the lateral lobes impresso-punctate, of metazona both dorsad and laterad much more densely and finely so, as seen from dorsum the pronotum is faintly strangulate mesad, median carina low but evident, more sharply defined cephalad on the prozona

¹²¹ As the specimen available lacks the caudal limbs, the above generic features have been drawn from this single specimen, and amplified from I. Bolívar's original description of the genus.

¹²² Bolívar's description states: "Antennae breves in ♀ marginem posticum pronoti attingentes". In the specimen before me that margin is surpassed by a distance equal to one-fourth of the combined length of the head and pronotum.

than elsewhere, no lateral carinae present, transverse sulci moderately well impressed, the lateral intra-marginal, the dorsal first and the dorsal and lateral second and third (principal) sulci clearly marked, metazona very short, occupying but little more than one-fourth of the entire pronotal length; lateral lobes trapezoidal with their depth equal to two-thirds of their dorsal length, cephalic margin straight oblique, ventral margin obtuse-angulate mesad, the cephalic section subemarginate, the caudal straight oblique, ventro-caudal angle narrowly rounded obtuse-angulate, caudal margin ventrad straight vertical then oblique subarcuate to the junction with the caudal margin of the disk. Tegmina lateral, elliptically lanceolate, shorter than the pronotum, covering the tympana. Wings absent. Prosternal tubercle transversely flattened, markedly narrowed at base, transversely expanding distad, the disto-lateral points rounded tuberculate, distal margin between strongly arcuate emarginate transversely. Mesosternal lobes broader than deep, the interspace between narrower than one of the lobes, cuneate in outline, markedly broadening caudad; metasternal lobes but narrowly separated caudad of the subparallel foveolae. Supra-anal plate broadly concave excavate mesad; cerci very short, styliform; ovipositor valves short and stout, dorsal ones sharply recurved at apices, margins subcultriform but non-dentate, dorsal surface rather deeply excavate, ventral valves with apices briefly and rather bluntly recurved, an external marginal very stout and low tooth and an internal one of lesser emphasis, ventral plates sublongitudinally ridged, lateral plates with apices blunt acute and dorsal margin arcuate; subgenital plate with margins strongly arcuate laterad, mesad transversely biconcave with a short median intervalvar projection. Cephalic and median limbs moderately slender. Caudal femora¹²³ with distal part slender, dorsal carina produced in a spine, genicular lobes with their apices spinose; caudal tibiae with external extensor margin armed with 10 spines, apical one lacking, internal extensor margin with 10 spines besides the apical one; caudal tarsi with metatarsus subequal to the others united, subdepressed, ultimate article appreciably incrassate towards apex, arolia minute and shorter than tarsal claws.

Remarks.—By having the caudal margin of the pronotal disk emarginate, as well as the prosternal development, *Theomolpus* holds a distinctive position among the Australian genera referred to the Oxyini. To these features can be added as differential criteria the subequally wide frontal costa, which also is but partially sulcate, and the broadly rounded fastigio-facial angle as seen in profile. I am unable to comment upon the presence or absence of an apical spine on the external margin of the caudal tibiae, as the specimen in hand lacks the caudal limbs. The genus, however, is characteristic in so many respects that there is little possibility of its confusion with any other Australian genus.

Distribution.—Northern Queensland.

¹²³ As these limbs are lacking in the specimen before me, their features have been drawn from Bolivar's original description of the genus.

THEOMOLPUS BADIUS I. Bolívar

Plate 6, Figs. 54 and 55; Plate 10, Figs. 131-133

Theomolpus badius I. Bolívar, 1918, Trab. Mus. Nac. Cienc. Nat., Madr., Ser. Zool. No. 34: 37 [♀; N[orth] Queensland]; Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 101 [no additional information]; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 76 [no additional information].

Queensland.—Palm Island to Cooktown; 21.iv.-13.v.1896 (A. G. Mayer) 1 ♀ (Museum of Comparative Zoology).

The specimen here recorded has been pinned from a liquid preservative and in consequence has lost its colour tones and probably some parts of the pattern. It also lacks one antenna and both caudal limbs.

The essential structural features of the species have already been set forth under the generic treatment, and as the present specimen has had its coloration greatly altered by wet preservation, the following colour description has been translated from I. Bolívar, amplified only where and as the available specimen makes this desirable:

General colour liver brown.¹²⁴ Post-ocular bars of darker tone extending from eye across sides of head and lateral lobes of pronotum; occiput with two longitudinal lines of fuscous; fastigium with the margins before the eyes briefly pencilled with blackish, antennae black with base liver brown. Pronotum with dorsum having pale longitudinal areas, the middle fascia darker. Tegmina broadly marked with blackish costad, more narrowly so sutural, also with a weak darker median lineation. Pleura with short precoxal dark maculations. Abdomen proximad dark maculate in line with the tegmina, this pattern becoming obsolete mesad; a medio-longitudinal wash carries the median pronotal darkening distad over much of the proximal portion of the abdomen as a distally narrowing cloud. Cephalic tibiae green (ex Bolívar). Caudal femora (ex Bolívar) with external pagina having a paired series of fuscous maculations, distal portion of femora rufescent; caudal tibiae bluish, grey villose, proximo-extensor condyle maculate with fuscous, spines black-tipped.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♀, North Queensland, <i>type</i> , ex I. Bolívar	23.0	—	5.0	3.5	18.0
♀, Between Pahu Island and Cooktown, Queensland	29.5 ¹²⁵	12.0	5.7	4.5	— ¹²⁶

¹²⁴ The base colour is buffy in the decolourized specimen before me, which causes at least some of the darker elements of the pattern to stand out very distinctly.

¹²⁵ Abdomen apex somewhat bent dorsad, hence this measurement taken sectionally may be somewhat less than in life.

¹²⁶ Missing.

Distribution.—Northern Queensland, possibly coastal only. No exact locality for the species has been recorded.

In order to present a proper understanding of the difficulties which may be met, in attempting to evolve a logical tribal arrangement of genera which have been but imperfectly compared in the past, as is true of most of those of the Australian Cyrtacanthacridinae, it is necessary to make a few comments of retrospective or explanatory character. The 1893 "Révision" of Brunner¹²⁷ was the best general attempt to group, and supply key characters for, the major assemblages of these locusts. Stål, in 1878, gave us¹²⁸ what may be called a preliminary arrangement, but that of Brunner in numerous respects was a more comprehensive and inclusive one, and also somewhat closer to a natural arrangement. Granted that in some cases Brunner, like Stål, merely associated assemblages by the areas in which they were found, yet in other respects his presentation was an advance in analysis and understanding.

However, both of the above-mentioned authors utilized a number of characters as fundamentally diagnostic and discriminatory, some of which appear increasingly to be correlated with habits or ways of life, hence more clearly adaptations. We often find these shared by assemblages of essentially similar habits, but which differ widely in other far more basic and fundamental morphological features, such as the Old World Oxyini and the New World Leptysmini. Among the features used by Stål and Brunner, as well as many others since, may be mentioned the presence or absence of an apical spine on the external extensor margin of the caudal tibiae, the spiniform, transversely lamellate or basally constricted character of the prosternal spine, the presence or absence of marked lateral carinae of the pronotal dorsum, the degree and character of the production of the fastigium, and also the relative proportions of breadth to depth of the face.

It is now clearly evident from a number of recent studies that most of the above-mentioned features vary greatly within tribal limits. In some cases this is so marked that certain congeneric species, such as those of *Kosciuscola*, differ widely in the character of the prosternal process. Also numerous genera which by all other morphological criteria must be closely associated differ in respect to one or another of the above-mentioned features. This is especially true of members of the circumtropical Euthymiini (Euthymiae of authors), the Afro-Oriental Oxyrrhepini (in part the "Opomalae" of Brunner), the Neotropical Aucacriini (Aucacres of Rehn, 1943¹²⁹), and Tristirini (Tristirae of Rehn, 1942)¹³⁰ and the broadly Palaearctic and Neogaeic Melanoplina. The present study demonstrates that the Praxibulini (here established) also includes com-

¹²⁷ Ann. Mus. Stor. Nat. Genova 33: 133-51.

¹²⁸ "Systema Acridiodeorum" in Bihang K. Svenska Vetenskapsakad. Handl. 5 (4): 3-100.

¹²⁹ Proc. Acad. Nat. Sci. Philad. 95: 35.

¹³⁰ Trans. Amer. Ent. Soc. 68: 32.

ponents which negative the diagnostic key value of at least one of the features mentioned above.¹³¹

The genera treated in the pages which immediately follow were regarded by Brunner as members of what he referred to at that time as the "Platyphymata,"¹³² or must be assumed to have been so considered from the position given by Sjöstedt, when he tabulated his new Australian genera after publishing his various uncomparated descriptions of the same. Brunner's "Platyphymata" is clearly not a cohesive aggregation. The Palaearctic genus *Pezotettix* Burmeister (= *Platyphyma* Fischer) must certainly be removed from the vicinity of the various other genera with which Brunner associated it in 1893. It should be placed in a tribe *Pezotettigini*, which differs in many respects from all its supposed relatives as of 1893. The genus *Tristria* of Stål, which has usually been placed in juxtaposition to *Spathosternum* Krauss, both being Afro-Oriental assemblages, must be removed to the tribe of similar distribution containing *Oxyrrhepes* Stål and more closely related genera, the *Oxyrrhepini*. While *Tristria* shows fastigial differences from the other *oxyrrhepene* types, has more rounded caudal femoral genicular lobes, and a different type of prosternal process, it exhibits agreement in other features, such as the contiguous mesosternal lobes, the general character of all the limbs, including narrow and elongate arolia, the distinctive form of the male subgenital plate, and the absence of a definite specialized, and apparently stridulatory, area from the median portion of the discoidal field of the tegmina of the male (which structure is present in *Spathosternum*).

I find it necessary, for consistency, to place the genus *Spathosternum* Krauss, already mentioned, an Afro-Oriental type, in a tribe for which I would use the name *Spathosternini*, and to this assemblage also I refer the Australian genus *Laxabilla* Sjöstedt. The Australian genus *Praxibulus* I. Bolívar (= *Praxilla* Stål, preoccupied) was placed in the same "division" as *Platyphyma* (= *Pezotettix*) by Stål, and by Brunner in the same group, the "Platyphymata". The possession of lateral pronotal carinae and a basally compressed pronotal tubercle were, doubtless, the factors responsible for this association. We now know that the character of the prosternal tubercle shows a considerable range within the species of the related genus *Kosciuscola*, as shown in the present study, and that the emphasis of the lateral pronotal carinae also varies within generic entities. I am here removing *Praxibulus* from the association given it by Brunner and erecting the tribe *Praxibulini* to include *Praxibulus* I. Bolívar, *Methiola* Sjöstedt, *Methiolopsis* n. gen., and *Kosciuscola* Sjöstedt. The *Praxibulini* is an endemic Australian tribe, and it is discussed in greater detail here after consideration of the *Spathosternini*.

¹³¹ For comments on the tibial spine character mentioned above, see Rehn, *Ent. News* 67: 1-2 (1956).

¹³² *Ann. Mus. Stor. Nat. Genova* 33: 136 (1893).

Tribe SPATHOSTERNINI

This tribe, as here erected and defined, is based upon the Afro-Oriental genus *Spathosternum* Krauss,¹³³ with which I am associating the east Australian genus *Laxabilla* Sjöstedt. The latter clearly has been derived from the same stock as *Spathosternum*. The group features, which in the aggregate characterize the tribe, have been drawn from *Spathosternum* and *Laxabilla*, and are as follows:

Alate; brachypterous to macropterous. Elongate to subfusiform. Head subconical in general shape; fastigium trigonal in outline as seen from dorsum, disk of same shallowly impressed in male, this subobsolete in female, weakly carinulate medio-longitudinally in male but same hardly indicated in female; fastigio-facial angle moderately acute in profile; frontal costa narrowly V-sulcate medio-longitudinally; eyes little prominent as seen from dorsum; antennae with 18-22 articles (22 in *Spathosternum*, 18 in *Laxabilla*). Pronotum with an evident median carina, intersected only by the principal sulcus, and well-marked cariniform lateral shoulders; metazona of disk with its surface cribrosely impresso-punctulate, caudal margin of pronotal disk subtruncate (*Laxabilla*) or shallowly obtuse-angulate (*Spathosternum*); lateral lobes with ventral margin obtuse-angulate mesad. Tegmina ranging in length from but slightly longer than the pronotum (female of *Laxabilla*) to slightly surpassing the abdominal apex (forms of *Spathosternum*), apices of tegmina range from subtruncate to acuminate, the latter in response to reduction in length; intercalary areas with well-developed, closely placed, and chiefly transverse subparallel cross-nervures of stridulating type, this specialized area extending into the discoidal field distad of the divergence of the median vein from the humeral trunk, and it is present in both sexes but more extensive and decided in the male;¹³⁴ venation of anal-axillary aggregation very closely placed and parallel; costal margin with proximal lobation moderately evident. Wings ranging from rudimentary to fully developed. Prosternal process transverse, lamellate, subquadrate or approximately so in outline, somewhat narrowed at base, lateral sections thickened to a greater or lesser degree into supporting rods, distal margin truncate to subconcavely emarginate. Mesosternal lobes with interspace longitudinal, narrower than one of the lobes; metasternal lobes contiguous or subcontiguous (female of *Laxabilla*) in both sexes. Ultimate tergite of male abdomen with well-indicated or subobsolete furcular lobes; male supra-anal plate semicircular to broad trigonal in shape; cerci of male simple, styliform; subgenital plate of male subconical. Caudal femora with genicular lobes rounded, paginal pattern regular but not deeply impressed, longitudinal femoral carinae low but distinct,

¹³³ S.B. Akad. Wiss. Wien, Math.-nat. Cl. 76 (1): 44 (1877). Genotype (by monotypy) *S. nigro-taeniatum* (Stål) [*Tristria nigro-taeniata* Stål, 1876; Damaraland].

¹³⁴ In the female of *Laxabilla*, which has abbreviate and acuminate tegmina, this area is but weakly developed although indicated. It is well developed, however, in the male sex of the genus.

entire; caudal tibiae with 10-13 external extensor spines and 10-12 internal ones, each count including an "apical" spine, this being larger on the internal margin than the adjacent ones on the same margin, which has the three distal spines (aside from the "apical") very appreciably shorter than those more mesad on the same margin, lateral extensor margins of tibiae between spines rounded and non-lamellate, external pair of distal spurs distinctly shorter than internal ones, all falcate; caudal tarsi with proximal article (metatarsus) slightly longer than third article, appreciably depressed dorsad, tarsal claws subequal in length, arolium subcircular in outline.

Distribution of tribe.—Tropical Africa from Senegal, Cameroons, northern Belgian Congo, Uganda, and Kenya, south to south-west Africa and southern Tanganyika; south-eastern Asia from Kashmir across India, Burma, Siam, southern and south-eastern China (Szechuan to Kwantung) to Vietnam; and central-eastern Australia (southern Queensland and New South Wales).

Remarks.—This tribe was referred to as a distinct entity by Tinkham, who in 1940 termed it the "group Spathosterni",¹³⁵ while Mishchenko in 1952 referred to the same category as the "Tribe Tristiriini",¹³⁶ doubtless considering that one of its components was the Afro-Oriental genus *Tristria*, which I am showing elsewhere cannot be associated with *Spathosternum*. The Spathosternini is represented in Australia solely by the genus *Laxabilla*, the affinity of which has never been determined previously. As may be evidenced from its distribution it is probable that *Laxabilla* is a relatively recent arrival from the Oriental region, where the related genus *Spathosternum*, the sole other component of the tribe which I have studied, is broadly distributed, reaching northward to southern China, although it does not seem to be present in Indonesia. However, the absence of *Laxabilla* from northern and central Queensland may indicate that it was probably not one of the last arrivals, and may have reached Australia at a period more contemporaneous with the first wave of *Atractomorpha*, which stage I consider is represented by *A. crenaticeps australis*.¹³⁷ The agreement of *Spathosternum* and *Laxabilla* in so many features of their morphology points conclusively to a relatively close relationship and common origin.

Genus LAXABILLA Sjöstedt

Laxabilla Sjöstedt, 1933, Ark. Zool. 26A (9): 5; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 60, 77.

Ribullata Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 60, 78.

Genotype (by monotypy) *Laxabilla smaragdina* Sjöstedt.

The genus *Laxabilla* was based on a single female of the genotypic species, which specimen is now before me. It is evident that the genus *Ribullata* (based solely on *R. mirabilis* Sjöstedt) represents the male sex of *Laxabilla*, a conclusion suggested by Dr. Key, and established by the evidence of the series of both

¹³⁵ Lingnan Sci. J. 19 (3): 276, 286.

¹³⁶ Fauna U.S.S.R., Tom IV, vyp. 2, Nasekomye Pryamokrylye Saranchevye (Catantopinae), Zool. Inst. Akad. Nauk. S.S.S.R. n.s. no. 54: 68, 125 (1952). [In Russian.]

¹³⁷ See Vol. II, pp. 31-2.

sexes now before me. Sjöstedt knew but a single female of *Laxabilla*, and he failed to appreciate that the male which he described as *Ribullata* was congeneric, which fact is demonstrated by a mated pair of *L. smaragdina*, from Calm Downs, Queensland, now before me.

As mentioned in the tribal comments *Laxabilla* is more closely related to the Afro-Oriental genus *Spathosternum* Krauss than to any other, although there are a number of features of difference between the two. The more evident of these are the sub-bulbose character of the fastigio-facial area in *Laxabilla*, rather than the more normal type seen in *Spathosternum*, the more finely and linearly etched impression of the frontal costa, rather than the V-sulcation seen in *Spathosternum*, the much weaker and less marked median carina of the pronotal disk and the far less evident lateral shoulders of the same than in *Spathosternum*, in the caudal margin of the pronotal disk being transversely subtruncate, rather than obtuse-angulate, as in *Spathosternum*, and in the tegmina being definitely shorter in both sexes than in *Spathosternum*. The antennae also have fewer articles (18) than in *Spathosternum* (22), while the prosternal process has the lateral supporting "rods" less marked than in *Spathosternum* and the distal margin of the process is more truncate in *Laxabilla* than in *Spathosternum* and less distinctly concave emarginate transversely.

Generic characters.—Body slender, usually fusiform, brevialate (♂) to brachypterous (♀). Head conic to subconic in both dorsal and lateral aspects, facial line markedly retreating; fastigium, as seen from dorsum arcuately to acute-angulately produced cephalad of eyes, sub-bulbose, disk of fastigium shallowly impressed on each side of a distinct (♂) or subobsolete to obsolete (♀) median carinula; fastigio-facial angle, as seen in profile, narrowly rounded; frontal costa moderately broad, lateral borders evident dorsad, weakly indicated ventrad, narrowly and linearly sulcate mesad for the greater portion of length of costa; supplementary facial carinae well marked, more strongly diverging in ventral portion, infra-ocularly each is accompanied on internal side by a subparallel clearly placed carina of similar type; eyes little produced, pyriform in basal outline; antennae short, faintly depressed, with 22 articles. Pronotum more compressed in male than in female, median carina of disk low but distinct, lateral carinae of disk weakly marked, cephalic margin of disk subarcuate, caudal margin of same subtruncate, principal transverse sulcus intersecting the median carina of the disk. Tegmina covering from three-fifths to three-quarters of the abdomen in male, narrow; apices narrowly rounded to subtruncate, costal margin shallowly bisigmoid, sutural margin straight; distal interspace between the discoidal and median veins with a closely placed pattern of subparallel cross nervures; tegmina of female at most but slightly longer than the pronotum, their apices little if any surpassing the distal margin of the second abdominal tergite, acute lanceolate in outline, longitudinal venation quite strongly marked, closely placed with the elements converging distad to the acute apex, subobsolete indications of the cross neuration found in the male evident in the same area. Wings rudimentary in both sexes, completely hidden under the tegmina. Prosternal process transverse, sublamellate, somewhat

expanding from base to apex, lateral sections cingulately thickened, transverse apical margin ranging from subtruncate to moderately concave. Interspace between mesosternal lobes ranging from very narrow and strongly longitudinal (♂) to nearly or quite subquadrate (♀), in each case broader than the mesosternal lobes; metasternal lobes contiguous in both sexes. Male with distal abdominal tergite with depressed lobate and marginally arcuate furcula; supra-anal plate subsemicircular in outline with a shallow, produced medio-apical lobule, surface of disk sulcate proximo-mesad; cerci simple and tapering, narrowly surpassing the apex of the supra-anal plate; subgenital plate subconical as seen in dorsal or ventral aspects, immediate apex narrowly rounded as seen from dorsum. Female with supra-anal plate subtrigonal in outline as seen from dorsum, longitudinally sulcate mesad, more broadly so proximad; ovipositor valves with external borders of dorsal pair virtually entire, proximo-lateral tooth of external margin of ventral pair well marked. Cephalic and median femora of males somewhat tumid; caudal femora in males somewhat surpassing, in females equalling, the apex of the abdomen, genicular lobes rounded distad; caudal tibiae somewhat shorter than the femora, armed with 10-11 external and 10-12 internal spines, with apical one present on each margin; tarsi with equal claws, arolia well developed.

Discussion.—The genus breaks into two sections, which are more readily separated in the male than in the female sex. One of these comprises Sjöstedt's *mirabilis* as I understand it, and the other is made up of the genotypic species *smaragdina*, which is composed of two subspecies. The *mirabilis* section is apparently of localized distribution, while *smaragdina* occurs over the entire known range of the genus.

Distribution.—Extending from as far north as south-eastern Queensland (Eidsvold, Jandowae, Calm Downs, and the Brisbane region) south to south-central New South Wales (Adelong area), and from the New England Plateau west to the western side of the Nandewar and Warrumbungle Ranges in the same State.

KEY TO FORMS OF THE GENUS LAXABULLA

1. General form of ♂ proportionately narrower and more compressed, more attenuate as seen from dorsum. Fastigium of ♀ as seen from dorsum with its outline regularly arcuate. Profile of face of ♀ more strongly retreating. Basal outline of eye of ♂ more elongate subpyriform. Pronotum of ♂ narrower as seen from dorsum, its discal surface very distinctly so. (Brisbane and Tambourine Mountain areas of south-eastern Queensland.) *mirabilis* (Sjöstedt)

General form of ♂ proportionately broader, less attenuate as seen from dorsum. Fastigium of ♀ as seen from dorsum with its outline rounded obtuse-angulate to rectangulate. Profile of face of ♀ less strongly retreating. Basal outline of eye of ♂ broader and less elongate pyriform. Pronotum of ♂ proportionately broader as seen from dorsum 2

2. Fastigial outline as seen from dorsum more produced, in ♂ acute-angulate, in ♀ obtuse-angulate, in both sexes less rounded at apex than in the alternative of couplet 1. Eye outline of ♂ as seen from dorsum less protuberant laterad. (Eastern border of Murray-Darling basin in south-east Queensland and east New South Wales.) *smaragdina acuta* n. subsp.

Fastigial outline as seen from dorsum, in both sexes, less produced, obtuse-angulate. Eye outline of ♂ as seen from dorsum more protuberant laterad. (Coastal section of south-east Queensland and the New England Plateau and related elevations in north-east New South Wales.)

smaragdina smaragdina Sjöstedt

LAXABILLA MIRABILIS (Sjöstedt)

Plate 11, Figs. 134-137; Plate 22, Figs. 220-225

Ribullata mirabilis Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 78 (♂; Brisbane, Queensland).

Queensland.—Tambourine Mountain;¹³⁸ 17-18.v.1942 (K. H. L. Key) 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra).

The unique type of this species was said to be in the Stockholm Museum.

The original description of the genus *Ribullata* and that of the species *mirabilis* contain but little which would help assign the specific name with positiveness. The last-mentioned description is entirely of colour, hence of little diagnostic value in a genus of dichromatic species. I am using the name *mirabilis* for the present species, the male sex of which is readily separable from that of its congeners, as it answers more fully to certain points used in the description of *Ribullata* than do males of the other forms. These points are the more strongly reclinate face, which was said to be "valde reclinata", the narrower and more compressed pronotum, thus agreeing with Sjöstedt's "lateri pronoti compressa", and the outline of the male supra-anal plate, which is more "semicircularis" than in the others.¹³⁹ None of the remainder of Sjöstedt's generic description of *Ribullata* is sufficiently distinctive to be of any help in placing the species, while the specific description would apply equally to all members of the genus in the same colour phase.

While Sjöstedt states that the tegmina are abbreviate in the unique type of this species, and that they do not reach the apex of the abdomen, his measurements of them are clearly erroneous, the body length being given as 15 mm, and the tegmina (elytra) as 12, a ratio which is found in no member of the genus, and which contradicts his statement as to the tegminal abbreviation on the same page. Doubtless the measurement of the tegmina is a transcriptional or typographical slip, perhaps for "7".

The female individual which I am assigning to *mirabilis* is less readily separated from the other members of the genus than is the male, but it agrees

¹³⁸ See Vol. I, p. 43 text and footnote 69. For an interesting account of Tambourine Mountain, see Musgrave, Aust. Mus. Mag. 2: 379-85 (1926).

¹³⁹ That is, exclusive of the apical lobule, which all forms of the genus possess.

reasonably well in ambisexual features, and, I believe, represents the opposite sex of the species, the male of which is quite distinctive.

As I also have a female of *L. smaragdina* from Tambourine Mountain, taken by the same collector and on the same visit as both sexes of *mirabilis* were collected, I can only conclude that the latter has a very localized distribution in south-eastern Queensland and there occurs with *smaragdina*, or both may be found at different levels or under different habitat conditions in the same general area. The latter possibility, however, is purely an assumption, and more evidence is needed to determine whether the two species actually occur together or in distinct microfaunulae.

Tambourine Mountain and Brisbane are the only localities known at present for *mirabilis*.

The following features are the most evident ones for *mirabilis* as I understand it.

Male (Tambourine Mountain, Queensland).—Body slender, less fusiform than in the other forms of the genus, subcompressed; surface of pronotum, face, pleura, and meso-metasterna at least in parts shallowly impresso-punctulate, the pronotal disk with the metazona more densely so than cephalad on the disk, remainder of body surface virtually glabrous.

Head distinctly conoid in its general outline, the exposed dorsal length slightly less than that of the pronotal disk, the lateral outline of the eyes, as seen from the dorsum passing cephalad with little break into the fastigial subacute-angulate outline, the latter having its lateral sections faintly arcuate to the well-rounded apex, length of fastigium cephalad of the eyes equal to two-fifths of the basal breadth of the fastigium at the cephalic point of the eyes, surface of fastigium with the medio-longitudinal carinula low but quite distinct, and continued in diminishing emphasis over the interocular space and on to the occiput, becoming obsolete on the latter, surface of fastigial disk on each side of the median carinula distinctly though not deeply excavate; least breadth of interocular space equal to slightly more than half of the greatest fastigial breadth (as 10 to 17); profile of fastigium and occiput nearly straight, weakly decurving cephalad to the narrowly rounded but well-marked fastigio-facial angle; profile of face rather strongly retreating, weakly arcuate dorsad to fastigio-facial angle; frontal costa moderately but evenly widening ventrad to the region of the median ocellus, thence ventrad of subequal breadth, lateral borders progressively less evident ventrad, sulcation evident throughout, narrow and median as characteristic of the genus, deeper dorsad of median ocellus than ventrad of same; eyes in basal outline elongate ovoid-pyriform, greatest breadth of outline nearly equal to three-fifths of its greatest length (as 27 to 45), least infra-ocular depth of genae equal to hardly more than one-fourth of greatest breadth of eye outline (as 7 to 27). Antennae approximately 1.25 times as long as the pronotal disk, somewhat thickening distad, apex bluntly rounded, composed of 18 articles.

Pronotum with its greatest breadth (across lateral lobes) distinctly less than the median length of the disk (as 16 to 20), latter strongly longitudinal, its

greatest breadth caudad (including the lateral carinae) subequal to half the median discal length, lateral shoulders and weak carinae subparallel cephalad, very faintly diverging in caudal half; principal transverse sulcus placed at caudal third, it alone bisecting the distinct but low and transversely rounded median carina, a more cephalic transverse sulcus clearly evident only on the lateral lobes and obsoletely crossing the lateral carinae; lateral lobes longer than deep, their greatest depth approximately seven-elevenths of their greatest length dorsad (as 35 to 53), cephalic margin straight oblique, ventro-cephalic angle rounded obtuse, ventral margin weakly and very broadly obtuse-angulate, ventro-caudal angle rounded, caudal margin ventrad briefly vertical, then oblique to the caudal margin of the disk, intra-marginal cephalic sulcus weak but apparent, principal sulcus less distinctly impressed and less extensive ventrad on the lobes than the one preceding it; surface of lobes with an infra-median raised callose bar which continues a structurally less marked pale post-ocular bar of the head.

Tegmina covering about two-thirds of abdomen, with costal margin distad rounding to the subtruncate apex of the discoidal field, mediastine vein carried to the apex of the marginal field; longitudinal venation of the discoidal field strongly marked and straight except for the obliquity of the median vein in the distal two-fifths of the tegmen, transverse venation of the discoidal interspace numerous, regular, and closely pectinate in disposition, apparently of stridulatory value. Wings merely slip-like structures, not surpassing the distal margin of the proximal abdominal tergite.

Prosternal process with apex subangulately concave; interspace between mesosternal lobes about three times as long as broad, mesosternal lobes with medio-caudal angle somewhat broadly and arcuately sublobate.

Distal abdominal tergite with the margin of the interspace between the broadly arcuate furcula sharply and acutely fissate, proximad of which the tergite bears a sharply cut medio-longitudinal carinula, the furcula with the margin somewhat thickened; supra-anal plate with proximal breadth 1.5 times its median length, outline and sculpture as described for the genus; cerci straight, surpassing the apex of the supra-anal plate by a distance subequal to the proximal depth of the cerci; subgenital plate as seen in profile with its apex subrectangulate.

Caudal femora with their greatest depth at proximal fourth contained four times in their length (as 13 to 53); caudal tibiae shorter than the femora by a distance equal to one-third of the length of the pronotal disk, armed on each margin with 11 spines.

Female (Tambourine Mountain, Queensland).—Differing from the preceding description of the male in the following noteworthy respects. Form heavier and more fusiform than in the male, not subcompressed as in the latter; surface impresso-punctulations as in male, but substrigately disposed on the pronotal metazona of the disk.

Head broader and even more definitely conic than in the male, particularly in its dorsal aspect, the outline of the eyes but little modifying the general

contour, facial line slightly less strongly retreating than in the male, exposed dorsal length of head appreciably less than that of the pronotal disk; fastigium much broader than in the male, its arcuate outline projecting cephalad of the cephalic point of the eyes a distance equal to but one-third of the greatest breadth between the eyes (as 2 to 6), median carinula and fastigial discal impressions obsolete, no trace of the carinula on the occiput, profile outline of fastigium and occiput weakly more arcuate than in the male, the decurvature cephalad to the fastigio-facial angle slightly more evident; frontal costa much as in male, but more uniform in breadth except for a narrowing ventrad of the fastigio-facial juncture and the less deeply impressed character of the sulcation; eyes in basal outline faintly more elongate ovoid-pyriform than in male, the greatest breadth of the outline faintly less than two-thirds of its greatest length (as 30 to 52), least infra-ocular depth of genae equal to one-third of the greatest breadth of the eye outline (as 12 to 30). Antennae proportionately shorter than in the male, nine-tenths as long as the pronotal disk (as 72 to 79).

Pronotum broader than in male, as seen from dorsum weakly broadening caudad, its greatest breadth caudad across lateral lobes subequal to the median length of the disk, the latter with its own greatest width caudad equal to three-fourths of its length (as 18 to 24); median carina low and rounded but distinct and intersected only by the principal transverse sulcus, lateral shoulders evident but very low, broad and rounded transversely, as a whole very faintly diverging caudad; principal transverse sulcus intersecting the carinae at three-fifths of the pronotal length; lateral lobes as in the male sex but less strongly longitudinal, their greatest depth equal to not quite seven-tenths of their dorsal length (as 49 to 68).

Tegmina but slightly longer than the dorsum of the pronotum, their apices reaching only to the base of the third abdominal tergite, lanceolate in outline, apices acute, greatest breadth mesad and equal to but slightly more than two-fifths of the tegminal length (as 13 to 30), costal margin arcuate throughout, somewhat straighter in distal third, sutural margin arcuate, somewhat straighter in proximal half; marginal field with three moderately well-marked subparallel and arcuate longitudinal nervures, obscure indications of short transverse nervures in the most of the medio-discoidal interspace where the male sex has well-marked and regular cross-veins, longitudinal elements of the venation of the discoidal and axillary field well marked, elevated and parallel, curving distad toward the tegminal apex. Wings as in the male.

Interspace between mesosternal lobes nearly subquadrate, slightly longitudinal, mesosternal lobes subrectangulate, broader than deep, meso-caudal angle well rounded.

Abdomen subcompressed, as a whole slightly more tectate dorsad than in the male; supra-anal plate quite strongly compressed laterad, the subvertical surfaces there subexcavate, medio-dorsal area narrowing distad and its central sulcation roughly divided into a larger ovate proximal section and a narrower distal one; cerci tapering, short, and rather stout at base, falling quite short of apex of supra-anal plate; ovipositor valves moderately compressed, apices reasonably

recurved, ventral pair with proximo-lateral tooth roughly rectangulate in outline, lateral plate narrow, acuminate distad; subgenital plate with distal margin having an acute median intervalvar production.

Caudal tibiae shorter than the caudal femora by a distance but slightly less than half the length of the pronotal disk (as 12 to 26), armed on the margins with 10 external and 12 internal spines.¹⁴⁰

Measurements (in millimetres).—♂, length of body, 15.0; length of antenna, 3.6; length of pronotum, 3.2; length of tegmen, 7.3; length of caudal femur, 8.6.¹⁴¹ ♀, length of body, 21.0; length of antenna, 3.5; length of pronotum, 4.0; length of tegmen, 4.7; length of caudal femur, 11.4.

Coloration.—The male before me is in the brown phase, the female represents the same but has tegminal coloration suggesting the green phase as seen in *L. smaragdina*. The head, pronotum, and pleura in both show pale pinkish cream-colour post-ocular bars which reach from the eye across the genae, over the raised opaque area on the lateral lobes of the pronotum, slanting a little more obliquely across the mesopleura to the insertion of the median limbs, in addition to which the head has a similar pale line on the genae ventrad of the eyes, this following along the ventral border of the genae, while the metapleura have similar well-marked ones. The general tone of the male is cinnamon-brown on the dorsum, the area between the dorsal tone and the pale bars on the head and pronotum, the dark lower portion of the lateral lobes of the pronotum, a dorsal bordering of the infra-ocular pale bar on the head and much of the pleura mummy brown to fuscous black, the raised ventral border of the lateral lobes narrowly pale lined. The face and most of the ventral surface grades from snuff brown to bister, while the abdomen bears bister lateral bars which become weaker, less extensive, and broken distad, while in the male they are virtually confluent dorsad on the proximal portion of the abdomen; broad medio-longitudinal bar on the abdomen of the female pale clay colour, while in the male this is evident only, and then less sharply cut, on the more distal tergites, while the more proximal ones have the pale tone indicated only by a medio-dorsal series of circular dots. The tegmina in the male are pencilled along the longitudinal veins with cinnamon-brown and heavily washed proximad in the marginal field with prout's brown. In the female the dorsum of the head and pronotum is clay colour, but slightly darker than the tone of the dorsal abdominal pale bar, while the tegmina in that sex are kildare green (of Ridgway) in the discoidal and axillary fields except that the immediate sutural margin is narrowly cinnamon, and the medio-discoidal area distad is shining bister, the veins of the humeral trunk are washed with cinnamon and the proximal section of the marginal field is distinctly washed, as in the male, with prout's brown. Antennae above as the dorsal surface, somewhat darkened ventrad. Eyes greyish cupreous, with remnants of numerous narrow prout's brown lines following

¹⁴⁰ As with the single male seen, the only female examined has one tibia broken, hence the spine count in each case is of a single limb.

¹⁴¹ Sjöstedt's measurements of the type of *mirabilis* were given as "Long. [body] 15, ant. 3, pron. 3, elytr. [tegmen] 12, fem. p. 9, tib. p. 7 mm."

the greatest eye dimension. General colour of the limbs buckthorn brown, overwashed in places with prout's brown, caudal femora with dorsal surfaces clay colour to cinnamon, external paginal face washed with prout's brown, more strongly so in dorsal section; caudal tibiae clay colour to tawny-olive, obscurely dotted with mummy brown in the female, spines black tipped.

LAXABILLA SMARAGDINA Sjöstedt

This species is made up of two geographic subspecies, which typically are quite distinct and inhabit different areas, but which intergrade in certain sections that apparently are transitional in character.

The typical form (*L. s. smaragdina*) is less attenuate, with the fastigium less produced and more obtuse-angulate in both sexes, while the other subspecies (*L. s. acuta*) is more attenuate and with the fastigium more produced and acute-angulate in the male. It would appear from their general morphology that *L. s. smaragdina* represents the opposite extreme of the genus from *L. mirabilis*, and that *L. s. acuta* stands in an intermediate position. However, the intergradation of *L. s. smaragdina* and *L. s. acuta* is clearly evident from the material before me, and *mirabilis*, as far as present knowledge is concerned, appears to be a distinct specific entity occurring in the same area as *L. s. smaragdina*.¹⁴²

The combined distribution of the two subspecies extends over the entire range of the genus, i.e. from as far north as Eidsvold, eastern Queensland, southward as far as the vicinity of Adelong, south-central New South Wales, and from the coastal section of Queensland near Brisbane and Tambourine Mountain west to the upper Condamine (Jandowae) in Queensland and the eastern border of the Murray-Darling plains, at or near the western bases of the Nandewar and Warrumbungle Ranges, in New South Wales.

LAXABILLA SMARAGDINA SMARAGDINA Sjöstedt

Plate 11, Figs. 138-141; Plate 22, Figs. 226-232

Laxabilla smaragdina Sjöstedt, 1933, Ark. Zool. 26A (9): 5, Plate 1, Fig. 4 (♀ (*type*): Eidsvold,¹⁴³ Queensland); Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 77 (no additional information).

Typical *L. s. smaragdina*

Queensland.—Eidsvold; (T. L. Bancroft) 1 ♀ (*type*) (Division of Entomology Museum, C.S.I.R.O., Canberra).

Atypical *L. s. smaragdina*

Queensland.—Mt. Coot-tha, Brisbane;¹⁴⁴ May 1942 (K. H. L. Key) 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia); 19.vii.1952 (K. H. L. Key) 2 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences

¹⁴² In the unnecessarily cryptic language of some present-day biological writing *mirabilis* is a "sympatric" species, but simple English tells the same story more clearly.

¹⁴³ About 33 miles NW. of Gayndah, near the Rawbelle River. Approximate position 25° 22' S., 151° 9' E.

¹⁴⁴ About 11 miles due west (air-line) of Brisbane.

of Philadelphia). Tambourine Mountain;¹⁴⁵ 17-18.v.1942 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 2 miles S. of Killarney;¹⁴⁶ Apr. 1941 (K. H. L. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra).

New South Wales.—13 miles N. of Tenterfield; Mar. 1941 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 19 miles S. of Glen Innes; Mar. 1941 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 10-13 miles N. of Guyra;¹⁴⁷ Mar. 1941 (K. H. L. Key) 4 ♂, 11 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Bullawa Creek,¹⁴⁸ E. of Narrabri; 6.iv.1951 (Key and Chinnick) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra).

Intermediate between *L. s. smaragdina* and *L. s. acuta*

New South Wales.—24 miles S. of Tenterfield; Mar. 1941 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Scone;¹⁴⁹ 19.ix.1950 (A. Dyce) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra).

Sjöstedt originally gave the type depository of *Laxabilla smaragdina* as the Stockholm Museum, but this unique specimen belonged to the Canberra collection, along with the bulk of the material reported in the same study, as shown by its first paragraph. The specimen was eventually returned to Canberra, and is now before me, bearing Sjöstedt's long-hand determination label and his characteristic red "Typus" label. It now lacks both antennae, the left cephalic and the right median tibiae, as well as the left median and right caudal and part of the left caudal tarsi. Both caudal limbs have at some time been detached and replaced.

The following features drawn from the type (female), the sole fully typical one of the subspecies available, are largely comparative with the preceding description of the female of *L. mirabilis*, and supplementary to those given by Sjöstedt in his original description.

General form somewhat stockier and less attenuate, head less strongly conical in profile, caudal femora proportionately more robust.

Head as seen from dorsum in outline equally as conical as in *mirabilis*, but fastigial outline, in the same view, more rounded obtuse-angulate instead of truly arcuate, the outline projecting cephalad of the eyes a distance equal to half that between the eyes (as 3 to 6), median carinula weakly and briefly indicated on fastigial disk alone, paired impression of latter evident but small and subtrigonal in outline; facial line somewhat less strongly retreating than in the same sex of *mirabilis*; frontal costa as in *mirabilis* but sulcation slightly less marked; eye outline as seen from the dorsum essentially as in the female of *mirabilis*, their basal outline as seen in profile with the greatest breadth equal

¹⁴⁵ See Vol. I, p. 43 text, and p. 43, footnote 69.

¹⁴⁶ See Vol. II, p. 34, footnote 62.

¹⁴⁷ See Vol. II, p. 39, footnote 70.

¹⁴⁸ A village about 12 miles ENE. of Narrabri. (Information from Dr. Key, November 1953.)

¹⁴⁹ See Vol. II, p. 150, footnote 219.

to three-fifths of the length of the same (as 30 to 50). Antennae lacking in the type.¹⁵⁰

Pronotum in general proportions as in the same sex of *mirabilis*, the same true of the character of the median and lateral carinae, lateral lobes, and transverse sulci.

Tegmina with character and proportions as in the female of *mirabilis* but apex somewhat less attenuately acute, the sutural margin distad slightly more strongly arcuate distad to the apex, venation as in *mirabilis*.

Prosternal process broader distad than in the female of *mirabilis*, its distal margin rather shallowly but appreciably concave. Interspace between mesosternal lobes and the lobes themselves as in the same sex of *mirabilis*.

Abdomen and its appendages as described for the female of *mirabilis* except that the medio-dorsal carinula is slightly more pronounced and the cerci are somewhat more slender.

Caudal femora with greatest depth at proximal fourth contained 3.25 times in their length (as 17.5 to 67); caudal tibiae shorter than the femora by a distance about equal to three-fifths of the length of the pronotal dorsum (as 15 to 26), armed on the margins with 10-11 external and 11 internal spines.

Male (atypical¹⁵¹).—Mt. Coot-tha, near Brisbane, Queensland. July 19, 1952 (K. H. L. Key) (Division of Entomology Museum, C.S.I.R.O., Canberra).

The features here given are comparative with the description of the male sex of *L. mirabilis* on pages 98 and 99.

General form more abbreviate, more robust, and less attenuate than in the male of *mirabilis*, less compressed.

Head less sharply conical in both dorsal and lateral aspects than in *mirabilis*, its exposed dorsal length subequal to two-thirds that of the pronotal disk (15 to 21), lateral outline of the eyes as seen from the dorsum more roundly protuberant and less prolonged caudad than in *mirabilis*; fastigium in outline rounded subrectangulate, projecting cephalad of the eyes a distance equal to three-sevenths of the breadth of the fastigium at the cephalic point of the eyes, surface of fastigium with the median carinula low but well indicated, hardly reaching caudad of the interocular space, paired fastigial depressions on each side of the median carinula well marked, subtrigonal in outline, least breadth of interocular space equal to five-sevenths of the greatest fastigial breadth (as 10 to 14); dorsal line of fastigium and occiput slightly more arcuate than in *mirabilis*, fastigio-facial angle in profile more broadly rounded acute than in *mirabilis*; profile of face less strongly retreating than in *mirabilis*, as a whole slightly straighter than in the latter; frontal costa with the portion dorsad of the median ocellus more impressed than sulcate, that ventrad of the

¹⁵⁰ An atypical female from Mt. Coot-tha, near Brisbane, Queensland, has the antennae seventeen-twentieths of the length of the pronotal dorsum (as 67 to 77).

¹⁵¹ In the absence of topotypic or other males from what would be considered the area of typical *L. s. smaragdina*, the present male is used to present features which distinguish it from the same sex of the other forms of the genus.

ocellus more definitely, although not strongly, sulcate, extreme dorsal point of the costa more strongly compressed than in the male of *mirabilis*; eyes in basal outline shorter and broader than in the same sex of *mirabilis*, less elongate ovoid-pyriform, greatest breadth of outline equal to two-thirds of its greatest length (as 27 to 41). Antennae 1.15 times as long as the pronotal disk, otherwise as in *mirabilis*.

Pronotum with its greatest breadth across lateral lobes equal to slightly more than seven-eighths the median length of the pronotal disk (as 17 to 19), latter also distinctly broader than in the same sex of *mirabilis*, its greatest breadth caudad (including the lateral carinae) nearly equal to two-thirds of the discal length (as 12 to 19), lateral carinae subparallel cephalad, very faintly diverging caudad; transverse sulci placed as in the male of *mirabilis*, but the principal and the preceding one are more evident and both clearly intersect the lateral carinae, while a first sulcus is indicated on the discal surface but does not cross any of the carinae, cephalic and caudal margins of the disk more subtruncate than in the male of *mirabilis*; lateral lobes with proportions, outline, and sculpture as in the male of *mirabilis*.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂, Mt. Coot-tha, Queensland (atypical) ¹⁵²	14.5	3.5	3.0	6.3	8.9
♂, Mt. Coot-tha, Queensland (atypical)	13.8	3.2	2.9	6.3	8.0
♂, 10-13 miles N. of Guyra, N.S.W. (atypical)	12.2	3.1	2.6	4.7	7.2
♂, 10-13 miles N. of Guyra, N.S.W. (atypical)	12.2	3.1	2.9	5.3	7.1
♂, Bullawa Creek, N.S.W. (atypical)	13.6	3.5	2.7	6.5	7.9
♀, Eidsvold, Queensland (<i>type</i>)	20.0	— ¹⁵³	4.0	4.7	10.5 ¹⁵⁴
♀, Mt. Coot-tha, Queensland (atypical)	20.3	3.4	4.0	4.8	11.0
♀, Mt. Coot-tha, Queensland (atypical)	19.3	3.9	3.9	4.4	10.5
♀, 10-13 miles N. of Guyra, N.S.W. (atypical)	19.8	2.9	3.7	4.5	10.4
♀, 10-13 miles N. of Guyra, N.S.W. (atypical)	17.1	2.9	3.4	3.7	8.8
Intermediate between <i>L. s. smaragdina</i> and <i>L. s. acuta</i>					
♀, 24 miles S. of Tenterfield, N.S.W.	16.6	3.4	3.5	4.0	9.9
♀, Scone, N.S.W.	20.0	3.2	4.0	4.8	10.7

¹⁵² Described specimen.

¹⁵³ Missing.

¹⁵⁴ Sjöstedt gave as the measurements of this specimen: "Corp. 19, pron. 3.8, elytr. 4.5, ant. 3, fem. p. 11, tib. p. 8 mm."

Tegmina slightly shorter than in the male of *mirabilis*, in agreement with the general less attenuate form, distad reaching to the same point on the abdomen, its form, character, and venation as in *mirabilis*.

Prosternal process, interspace between mesosternal lobes, and latter as in male of *mirabilis*.

Distal abdominal tergite with the furcula and adjacent margin as in the same sex of *mirabilis*; supra-anal plate as in *mirabilis* but lateral margins more broadly arcuate throughout and the median sulcation is more deeply impressed proximad; cerci and subgenital plate as in male of *mirabilis*.

Caudal femora somewhat more robust than in the male of *mirabilis*, their greatest depth at proximal fourth contained slightly less than four times in their length (as 14 to 55), the whole outline as seen in profile fuller and narrowing less evenly to the pregenicular constriction; caudal tibiae shorter than the femora by a distance nearly equal to two-thirds the length of the pronotal disk (as 12 to 19), armed on each margin with 11-12 spines.

Coloration.—The female sex of the typical subspecies of *smaragdina* exhibits both green and brown colour phases. Of the male sex there are before me only brown phase individuals. Between the green and brown phases in the female there is a fairly regular transition, as discussed in a subsequent paragraph.

Male (brown phase).—Essentially as described for this phase of *L. mirabilis*, but the lateral carinae of the pronotal disk are more clearly pencilled with pale ochraceous buff (10-13 miles N. of Guyra) to salmon-buff (Mt. Coot-tha), while the dorsal surfaces of the caudal femora are more contrastingly pinkish cinnamon, the face is sometimes somewhat paler, while the pale lateral bars on the genae, on the lateral lobes of the pronotum, and on the pleura are also sometimes lightly washed with pinkish, and the anal vein of the tegmina may or may not be finely pencilled with salmon-buff. The male from Bullawa Creek is distinctly paler than any others seen.

Female (extreme brown phase).—Very similar to the brown phase of *L. mirabilis* but lacking any trace of green coloration, the discoidal and axillary fields of the tegmina being unicolorous cinnamon with the dorsum of the head and pronotum, and as seen in profile the whole colour pattern of the body and limbs is as described for the female of *mirabilis*, except that the dorsal fourth of the external pagina of the caudal femora, up to the dorso-external carina, is deep fuscous, which, however, is much narrower to obsolete in individuals transitional to the green phase.

Female (extreme green phase).¹⁵⁵—Head, pronotum, pleura, greater part of tegmina and most of limbs almost entirely lumiere green (of Ridgway), this deepened to absinthe green to light cress green in the areas of the usual darker post-ocular bars, along the ventral portion of the lateral lobes of the pronotum,

¹⁵⁵ This description is drawn from female individuals from 10-13 miles N. of Guyra, N.S.W., all but one of which are in the extreme green phase, the exception having the dorsal surface of the head and pronotum faintly washed with buffy, also the costal half of tegmina, while the dorsal surfaces of the caudal femora are as in the brown phase.

and less definitely near the cephalic and caudal borders of the pronotal dorsum; pale post-ocular bars chartreuse yellow, area of the lateral carinae of pronotal disk finely pencilled externally with seal brown, this bordered internally by an equally narrow lining of cream colour; lateral lobes of pronotum with elevated ventral margin pencilled in cream colour, this bordered internally with a clouding of seal brown; tegmina with a discoidal preapical dash of brownish, while the costal field is more translucent, hence less definitely greenish, than the remainder of the tegmina; antennae almost entirely seal brown; eyes olive-buff lined with buffy brown; abdomen and ventral surface almost entirely tawny-olive, the dark lateral areas of the brown phase represented only by occasional dark ticking; cephalic and median tibiae washed distad with brownish olive, relevant tarsi similarly coloured; caudal femora with a weak and narrow dark line external to the dorso-external carina; caudal tibiae olive-buff, finely speckled with fawn colour, spines pale, fuscous tipped.

The virtual passage in coloration in the female sex from the green to the brown phase is clearly evident from the material studied. There is progressive suffusion with buffy of the dorsal surface of the head and pronotum, as well as of the axillary and discoidal areas of the tegmina, together with the increasing extent and emphasis of the dorsal dark lining of the external face of the caudal femora and of the lateral darkening of the abdomen. In all females the dark distal blotch on the tegmina is well marked. Two Mt. Coot-tha females are the first step away from the full brown phase female, which is before me in one individual from the same locality and from Tambourine Mountain. The next step toward the green extreme is represented by the single female from 13 miles N. of Tenterfield and that from 19 miles S. of Glen Innes, while that but a step removed from the other green phase females from 10-13 miles N. of Guyra is a single female from the same locality.¹⁵⁶ The Eidsvold type female is nearly intermediate between the two phases, but rather nearer the brown, while the Scone female intermediate between *L. s. smaragdina* and *L. s. acuta* is in the green phase, and that of similar type from 24 miles S. of Tenterfield is in the brown phase.

Distribution.—Typical *smaragdina* is known to me only from the Eidsvold, Queensland type. It is probable that its distribution will be found to extend considerably to the north of the type locality. Southward *smaragdina* becomes less typical, with a narrowing and more acute fastigial outline as seen from the dorsum. In this condition it extends over the elevated and more mountainous New England Plateau and associated ranges of north-eastern New South Wales, being represented by atypical material before me from as far south as 10 to 13 miles south of Guyra and westward to Bullawa Creek in the western portion of the Nandewar Range. Material from 24 miles south of Tenterfield and from Scone are clearly intermediate between *L. s. smaragdina* and *L. s. acuta* of the

¹⁵⁶ This is the minimum-sized female from that locality given in the preceding table of measurements. It has the shortest pronotum, tegmina, and caudal femora of any of that sex of this subspecies here studied.

more interior areas. At both of these localities it is probable that the influence of the interior element (in this case *L. s. acuta*) is pronounced, a condition which we know is true regarding Scone.¹⁵⁷

LAXABILLA SMARAGDINA ACUTA n. subsp.

Plate 11, Figs. 142-145; Plate 22, Figs. 233-236

The more definitely angulate outline of the fastigium in both sexes, as well as the more evident production of the same area, is the most obvious feature of difference of this subspecies from *L. s. smaragdina*. The whole body form is also somewhat more slender in both sexes, but this is more apparent in the male. In that sex also the eyes are less full as seen from the dorsum, although in profile there is very little difference in their basal outline. However, in the male, as seen in profile, the outline of the fastigio-facial angle is more narrowly rounded and the facial line is more straight oblique. The tegmina of the female are somewhat more attenuate distad than in that sex of *L. s. smaragdina*.

Type.—♀; 8 miles north of Gumin Gumin,¹⁵⁸ Warrumbungle Ranges, N.S.W. April 4, 1951 (Key and Chinnick) (Division of Entomology Museum, C.S.I.R.O., Canberra).

Differing from *L. s. smaragdina*,¹⁵⁹ and the preceding description of the same, in the following noteworthy respects.

General form somewhat more slender and narrower, this more particularly evident on the head immediately caudad of the eyes and caudad on the pronotum across the lateral lobes.

Head as a whole as seen from dorsum slightly more truly conical than in the other forms of the genus; fastigium as seen from the dorsum more trigonal with the apex very narrowly rounded and the more lateral portions of the outline more distinctly straight oblique, the outline projecting cephalad of the eyes a distance approximately equal to five-eighths that between the eyes (as 11 to 17), median carina even less evident and no longer than in *L. s. smaragdina*, paired fastigial impressions weaker and smaller than in latter; fastigio-facial angle more narrowly rounded than in either *L. s. smaragdina* or *L. mirabilis*, facial line more strongly oblique than in the same sex of *L. s. smaragdina* and in this respect much the same as *L. mirabilis*; eyes in outline as seen from dorsum as in those of the same sex of the other forms of the genus, basal outline of eye as seen in lateral aspect as in the female of *L. s. smaragdina*.

Pronotum slightly narrower and more slender than in the female of *L. s. smaragdina*, but in all other respects essentially as in the typical form.

Tegmina more attenuate distad than in *L. s. smaragdina*, their apices reaching at least to the distal margin of the third abdominal tergite, instead of but to the

¹⁵⁷ See discussion regarding *Monistria pustulifera dedita* in this series, Vol. II, pp. 149-54.

¹⁵⁸ "A pastoral station about 23 miles ENE. of Gulargambone." Its position is approximately 31° 16' S., 148° 52' E., its elevation in the neighbourhood of 300 metres.

¹⁵⁹ Comparison of the type of *L. s. acuta* have been made directly with the type of *L. s. smaragdina*.

proximal portion of that tergite as is the general condition in the typical form of the species.

Caudal femora much as in the female of *L. s. smaragdina*, but the tapering of the profile outline to the pregenicular constriction is less gradual, and the more proximal broadening is therefore somewhat more extended distad.

Allotype.—♂; same data as female (*type*) (Division of Entomology Museum, C.S.I.R.O., Canberra).

The features here given are those of noteworthy difference from the male sex of *L. s. smaragdina*.

General form more attenuate and more slender, appreciably narrower across the head and pronotum.

Head more conical and acuminate as seen from dorsum, in profile the fastigio-facial angle is more narrowly rounded and the facial line somewhat more sharply retreating, as seen from the dorsum the length of the head is equal to eight-ninths that of the pronotal disk (as 16 to 18); fastigium as seen from the dorsum more produced and distinctly more angulate, its length cephalad of the eyes equal to nine-elevenths of the fastigial breadth at the cephalic point of the eyes, median carinula of fastigium and its paired surface impressions as in the male of *L. s. smaragdina* except that the impressions are more sharply and more clearly angulate cephalad, least breadth of interocular space equal to two-thirds of the greatest breadth of the fastigium (as 10 to 15); eyes with their lateral outline as seen from the dorsum slightly less bullate, according more with the general more conical outline of the head, basal outline of eyes as seen in profile as in *L. s. smaragdina*. Antennae slightly shorter proportionately than in the male of the typical subspecies.

Pronotum in general form as in *L. s. smaragdina* with its margins, carinae, and sulci, as well as the pattern of the lateral lobes, of the same character.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂, 8 miles N. of Gumin Gumin, N.S.W., <i>allotype</i>	13.6	3.0	2.85	6.0	7.8
♂, 8 miles N. of Gumin Gumin, N.S.W., <i>paratype</i>	14.5	3.4	2.93	6.3	7.4
♂, 7 miles W. of Adelong, N.S.W., <i>paratype</i>	12.7	3.2	2.44	5.8	7.2
♂, Calm Downs Station, Queensland, atypical	12.7	3.4	2.60	5.2	7.9
♀, 8 miles N. of Gumin Gumin, N.S.W., <i>paratype</i>	19.8	2.93	3.4	5.2	8.9
♀, 8 miles N. of Gumin Gumin, N.S.W., <i>type</i>	19.5	3.5	3.7	5.2	10.5
♀, Calm Downs Station, Queensland, atypical	18.5	2.93	3.4	4.0	9.1

Tegmina and alar development as in the male of the typical form of the species.

Abdominal appendages, prosternal process, and sternal structure as in *L. s. smaragdina*. Caudal femora with the same type of less gradual narrowing to the pregenicular constriction which has been noted in the description of the female (type).

Coloration.—As with the typical subspecies of *L. smaragdina* the female sex of *L. s. acuta* exhibits both green and brown colour phases, and its colour pattern is as in the former. However, but a single individual of that sex in the brown phase is before me, and that is not quite the extreme condition of that phase, showing as it does a faint greenish wash on the dorsum of the fastigium, on the occiput, in the region of the ulnar veins of the tegmina and along the mid-dorsal carina of the caudal femora, with the face as a whole rivage green (of Ridgway), while the dorsal fuscous bordering of the external pagina of the caudal femora is strongly marked. This single brown-phase female, which, however, may not represent the extreme of that condition, is from 8 miles N. of Gumin Gumin, N.S.W., from which locality also came green phase individuals and intermediates between the two. The extreme green phase is basically as in *L. s. smaragdina*, but is appreciably lined or tinted with vinaceous-pink to cream buff, this colouring all the paler markings, as those of the genae, the lateral lobes of the pronotum and of the pleura, appreciably edging the internal border of the lateral carinae of the pronotal dorsum, and the dorso- and ventro-external faces and the ventral sulcus of the caudal femora, while the costal half of the tegmina is washed with terra cotta proximad with the usual distal fuscous streak strongly marked in the discoidal area. In other respects the green phase female is the same as that condition in *L. s. smaragdina*. The type is clearly intermediate between the green and brown phases as represented by the material now before me. It shows a well-marked vinaceous-pink to pinkish cinnamon wash on the occiput, much of the dorsum of the pronotum, over most of the tegmina and a somewhat greater portion of the caudal femora, this latter involving the ventral portion of their external paginae. However, elsewhere the green tone is as predominant as in full green-phase females.

All of the males before me are in the brown phase, and, except that almost all are as a whole somewhat paler, have their pattern as in the typical race of the species. While the two general base tones of *L. s. smaragdina* are mainly vinaceous-tawny (for the paler base) and seal brown (for the darker elements), in *L. s. acuta* these are chiefly cinnamon-buff to cinnamon and generally no darker than walnut brown respectively. The single male from 7 miles W. of Adelong is rather more contrastingly coloured and with the brown areas deeper in tone than those of that sex from the type locality.

The atypical females from Calm Downs Station and from the Jandowae area of Queensland all are in, or in one case very close to, the green phase.

Paratypes.—I have indicated six males and two females from the type locality as paratypes, also the single male from Adelong, N.S.W.

Remarks.—The subspecies *acuta* apparently replaces typical *smaragdina* in the Darling-Murray region to the west of the Dividing Range. To the northward it probably intergrades with typical *smaragdina* across the lower section of the Dividing Range in southern Queensland, which is suggested by the atypical character of the Queensland material of this subspecies.

Distribution.—The typical condition of *L. s. acuta* is known from two rather widely separated localities along the eastern border of the Darling-Murray plains, i.e. at Gumin Gumin in the western Warrumbungles, and near Adelong on the upper waters of the Tumut drainage. Material from near Jandowae and from 20 miles west of Wallangarra (i.e. Calm Downs Station) in Queensland is atypical of *acuta* (see above under Remarks). There is no information available as to whether this subspecies—or the species—extends to the westward over lower levels of the Darling-Murray plains.

Specimens examined.—16; 9 ♂, 7 ♀.

Typical *L. s. acuta*

New South Wales.—8 miles N. of Gumin Gumin; 4.iv.1951 (Key and Chinnick) 7 ♂, 3 ♀ (*type*, *allotype*, and *paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 7 miles W. of Adelong;¹⁶⁰ 20.ii.1951 (Key and Chinnick) 1 ♂ (*paratype*) (Division of Entomology Museum, C.S.I.R.O., Canberra).

Atypical *L. s. acuta*

Queensland.—10 miles NE. of Jandowae;¹⁶¹ Apr. 1948 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Calm Downs Station, 20 miles W. of Wallangarra;¹⁶² 15.v.1947 (K. B. Norris) 1 ♂, 3 ♀ (one pair *in coitu*) (Division of Entomology Museum, C.S.I.R.O., Canberra).

¹⁶⁰ Adelong is in SE. New South Wales in Wynyard County, at the north base of the Murray Range on Adelong Creek, an upper tributary of the Tumut River (Murrumbidgee-Murray system). Its position is 35° 18' S., 148° 4' E.

¹⁶¹ See Vol. II, p. 144, footnote 216.

¹⁶² Wallangarra is in extreme SE. portion of Queensland in Bentinck district, on New South Wales line. Its approximate position is 28° 56' S., 151° 55' E.

Tribe PRAXIBULINI

This assemblage, which is here characterized, is made up of four endemic Australian genera, these limited in distribution to areas of eastern Australia and Tasmania. The genera included are *Methiola* and *Kosciuscola* Sjöstedt, *Praxibulus* I. Bolívar, and *Methiolopsis* n. gen.

The features of the tribe, as an aggregate, are as follows.

Size medium to small, form elongate to robust and subfusiform, brachypterous. Head subconical to robust and broad, facial line moderately to decidedly retreating; fastigium in outline, as seen from dorsum, ranging from well-rounded to rectangulate, disk from shallowly to appreciably impresso-excavate, a medio-longitudinal carinula weakly marked or absent; fastigio-facial angle in profile ranging from broadly and obtusely rounded to narrowly rounded; frontal costa narrow and approximately subequal in breadth to broad and widening ventrad, its surface sulcate in whole or part or non-sulcate and impresso-punctate, lateral margins of costa ranging from distinctly carinate to rounded transversely; supplementary (lateral) facial carinae ranging in indication from well-marked to subobsolete; eyes as seen from the dorsum ranging in prominence from but little to distinctly prominent, as usual more evident in males; antennae with 20-22 articles. Pronotum subcylindrical and subequal in breadth to distinctly and regularly expanding caudad; median carina present and always severed by at least the principal sulcus; lateral carina of disk ranging from well-marked and moderately elevated to rounded and subobsolete, usually more evident in males; disk of pronotum rounded transversely or low subtectate, caudal margin of disk usually obtuse-angulate emarginate, but ranging to subtruncate or obtuse-angulate produced in *Praxibulus*; lateral lobes of pronotum obtuse-angulate meso-ventrad, caudal margin of lobes subsigmoid. Tegmina ovate to spatulate ovoid, reaching to or briefly surpassing the caudal margin of the proximal abdominal tergite; neuration of one of three types, one, consisting of a more or less evident cribrosely anastomosing reticulation with two or more precurrent and more evident elements of a longitudinal venation, two, with the tegminal surface sharply divided longitudinally into two distinct planes by a ridge-like cariniform shoulder, or, three, with a uniform, regular, and precurrent series of elevated and conspicuous longitudinal elements; apices of tegmina rounded to subacute, or broadly arcuato-truncate (female sex of *Praxibulus*). Wings rudimentary and completely hidden under the tegmina. Prosternal process transversely compressed, spiniform or ranging from subquadrately lamellate to cuneiform in outline; interspace between mesosternal lobes sublongitudinal through subquadrate to strongly transverse in proportions; metasternal lobes contiguous, subcontiguous (♂), or narrowly to broadly separated (♀). Ultimate abdominal tergite of male with furcula well developed or absent, supra-anal plate of male trigonally to transversely scutiform, with (*Praxibulus*) or without

(other genera) a transverse elevated and contrastingly coloured structure or varying type of development at proximal third (here referred to as the proximal crest), and when this is present the distal portion of plate usually bears a series of welt-like ridges, also contrastingly coloured; male cerci simple and conically tapering or somewhat flattened vertically in proximal section, apices acuminate to subacute or rarely with a preapical internal lobule; male subgenital plate rounded to moderately conical. Epiphallus of male with ancorae present as recurved hooks, lophi well marked and varied in type. Caudal femora with genicular lobes rounded to subangulate at their apices, Brunner's organ present; caudal tibiae with margins of extensor surface rounded, spines 8-12 in number, including an apical one present on each margin; caudal tarsi with proximal article (metatarsus) longer than the third, tarsal claws equal, arolia well developed.

Distribution of tribe.—From the Atherton Plateau area of northern Queensland south to the higher mountains and eastern coastal section of Victoria, west to the Nandewar and Liverpool Ranges and the elevated eastern border of the Darling-Murray plains in New South Wales, as well as the more alpine sections of Tasmania.

Sequence.—I would regard *Methiolopsis* as the most primitive member of the tribe, with *Methiola*, *Praxibulus*, and *Kosciuscola* in the order of divergent specialization. In some respects *Methiolopsis* and *Kosciuscola* seem to be more nearly related, such as certain tegminal features, but in most features they are widely separated, and the closer relationship of *Kosciuscola* to *Praxibulus* is more clearly evident.

Remarks.—The Praxibulini is an endemic Australian entity, limited to the eastern portion of the continent, and with its greatest diversity found in areas of New South Wales. Its distribution is further evidence of the intimate relationship of the Tasmanian fauna to that of the Australian mainland, and the probability of their Pleistocene continuity. As an aggregation of flightless forms the Praxibulini furnishes interesting evidence on the faunal history of the geologically recent past in south-eastern Australia.

KEY TO GENERA OF THE PRAXIBULINI

1. Fastigium with its disk distinctly, though not deeply, excavate, lacking a medio-longitudinal carinula, and with narrow and low but distinct cariniform lateral and cephalic borders; interocular area narrow, particularly in the male sex, in the latter never equal in breadth to the length of the fastigium cephalad of the interocular space. Frontal costa relatively narrow, appreciably sulcate in all or the greater part of its length, lateral borders of costa carinate. (Supplementary (lateral) facial carinae well marked and continuous. Caudal margin of pronotal disk appreciably emarginate. Prosternal process spiniform.) 2

Fastigium with its disk more shallowly excavate, occasionally with a low median carination, its cephalic and lateral margins low and at most

but weakly cariniform; interocular space relatively broad, even in males, greater in breadth than the length of the fastigium cephalad of the interocular space except in males of *Praxibulus* in which the two dimensions are subequal. Frontal costa broad, hardly at all sulcate, or if so rarely more than weakly excavate and but briefly so dorsad of the median ocellus, lateral borders of costa not truly carinate, usually broadly rounded transversely, the costa sometimes undefined ventro-laterad. (Supplementary (lateral) facial carinae sometimes subobsolete. Prosternal process variously developed.) 3

2. Tegmina with surface sharply divided longitudinally into two distinct areas of different planes by an elevated cariniform angulation. Subgenital plate of female with distal margin lacking distinct emarginations ventrad of the ovipositor valves. Lophi of male epiphallus elongate and in-bent

Methiolopsis n. gen.

Tegmina with surface not sharply divided longitudinally into two distinct areas of different planes, their venation as a whole being of the more general basic pattern of brachypterous grasshoppers. Subgenital plate of female with distal margin having pronounced emarginations ventrad of the ovipositor valves. Lophi of male epiphallus erect and corniform

Methiola Sjöstedt

3. Pronotum with disk more rounded transversely, lateral carinae but weakly indicated, median carina intersected by more than the principal sulcus, caudal margin of disk not emarginate.¹⁶³ Tegmina with anal field not sharply marked off from the discoidal; in females the tegmina are broadly arcuato-subtruncate distad and different in outline from the ovoid ones of males; longitudinal venation regularly spaced and precurrent. Male abdomen with apex usually recurved; male supra-anal plate with an erect transverse median lamellation (here termed the proximal crest), or at least a rudimentary development of the same, plus contrastingly coloured carinations distad on the same plate (except in *P. insolens*)

Praxibulus I. Bolívar

Pronotum with disk more tectate or subtectate transversely, lateral carinae well-marked but rounded, median carina intersected solely by the principal sulcus, caudal margin of disk obtusely emarginate. Tegmina with anal field sharply marked off from the discoidal; in females the tegmina are similar in their acute-ovoid outline to those of males; longitudinal precurrent venation in both sexes limited to two simple elements, one in the usual position of the humeral trunk, the other separating the discoidal and anal fields. Male abdomen with apex not at all recurved; male supra-anal plate without a median transverse erect lamellation or rudiment of the same

Kosciuscola Sjöstedt

¹⁶³ Rarely so in specimens departing from the norm of the genus.

Genus METHIOLOPSIS¹⁶⁴ n. gen.

Praxilla Stål, 1878, Bihang K. Vetenskapsakad. Handl. 5 (4): 95 (in part only).

Methiola Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 103 (in part only);

Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 79 (in part only).

Genotype (here designated) *Praxilla geniculata* Stål.

This genus is closely related to *Methiola*, and its sole species was regarded by Sjöstedt as a member of that genus. However, the very marked difference in the construction of the tegmina, which have their surface divided longitudinally into two distinct areas, of different planes, by an elevated carinate angulation, by the simpler and more usual, rather than ventro-laterad concave-emarginate, distal margin of the female subgenital plate, and also by the very distinctive elongate in-bent lateral lophi¹⁶⁵ of the epiphallus of the male internal genitalia, rather than the erect corniform type of the same structures seen in *Methiola*, fully warrant its separation from *Methiola*. To permit *Methiolopsis geniculata* to remain in the same genus with *Methiola picta* would require for consistency, either the disregard of very obvious features of generic worth, or the synonymy of other generally recognized genera which are distinguished by features of no greater, and in some cases distinctly lesser, value.

Generic characters.—Brachypterous. Body subfusiform in the female as seen from the dorsum, more subcylindrical in the male; surface relatively smooth except for that of the pronotum which is in part shallowly rugulose, plus some indication of the same type ventrad on the face. Head subconic in lateral aspect, more definitely so in the male, as seen from the dorsum not narrowing post-ocularly, facial line markedly retreating in the male, less strongly so in the female; fastigium as seen from the dorsum in outline rectangulate in the male, obtuse-angulate in the female, but moderately produced cephalad of the eyes, this more evident in the male than in the female, in both sexes with its overall breadth greater than its length cephalad of the least interocular space, its disk impresso-excavate in the male, more shallowly so in the female, its lateral borders well marked caudad to interocular space, no median carina present; fastigio-facial angle as seen in profile obtusely rounded; frontal costa with its lateral borders carinate for the greater part of its depth in the male, less extensive and less sharply carinate in the female, weakly broadening from the fastigio-facial juncture to the antennal insertion, thence subequal ventrad, narrower in the male than in the female, in the male its surface decidedly sulcate dorsad of the median ocellus, ventrad of the same much more shallowly impressed, in the female the surface is impresso-punctate with a shallow broad subexcavation ventrad to the antennal bases; supplementary facial carinae well marked and elevated, regularly diverging ventrad; eyes moderately (♀) to distinctly (♂) prominent as seen from dorsum, in basal outline broad ovate (♂) to ovoid (♀); antennae moderately long, composed of 20-21 articles, in the male well surpassing

¹⁶⁴ From *Methiola* and 'opsis form or appearance, in allusion to its general resemblance to *Methiola*.

¹⁶⁵ See Roberts, Proc. Acad. Nat. Sci. Philad. 93: 244 (1941).

the combined length of the head and pronotum, in the female hardly equalling the same. Pronotum with its dorsal length greater than that of the head, and not expanding caudad in the male, in the female regularly broadening caudad as seen from dorsum; cephalic margin of disk very shallowly (σ) to appreciably (φ) arcuate, caudal margin bisarcuate with a distinct but broad and shallow angulate median emargination; median carina low but distinct, cut by all the transverse sulci in the male, less evidently so by the first and second sulci in the female, principal sulcus at approximately three-fourths of the pronotal length, lateral shoulders of the disk subobsolete in the male, in the female quite appreciable but rounded on the prozona and less definite on the metazona; lateral lobes with ventral margin obtuse-angulate, their caudal margin sub-sigmoid. Tegmina spatulate ovoid, in both sexes briefly surpassing the caudal margin of the proximal abdominal tergite, their greatest breadth mesad, surface with a cribrosely anastomosing venational pattern in which no strongly marked longitudinal elements are indicated, but with a single longitudinal ridge-like cariniform shoulder,¹⁶⁶ which divides the surface of the tegmen into what may be called anal and discoidal surfaces which transversely are on different planes. Wings rudimentary, completely hidden under the tegmina. Prosternal spine transversely compressed, erect, acute-trigonal with the apex attenuate and spiniform. Interspace between mesosternal lobes sublongitudinal in the male, moderately transverse in the female and somewhat broadening caudad, always narrower than one of the mesosternal lobes, which have their internal margins rather broadly arcuate; metasternal lobes contiguous in the male, moderately separated in the female. Male with ultimate abdominal tergite without furcula; supra-anal plate of that sex trigonally scutiform, its surface with a median sulcation and a transverse sublamellate ridge at proximal third, which, however, is less marked where it crosses the median sulcus than laterad, the areas between these surface features appreciably excavate; male cerci simple and conically tapering, apically acuminate and in length somewhat surpassing the apex of the supra-anal plate; male subgenital plate moderately conical, in profile the outline of the apex is blunt acute, dorso-lateral margins of plate reaching to and forming part of the apex; epiphallus of male internal genitalia with the lophi inserted near the lateral borders of the epiphallus and from a short erect base these are developed as horizontal attenuate processes projecting mesad and each almost half as long as the epiphallus is broad, ancorae developed as paired short hooks on median third of the proximal margin of the epiphallus (see Plate 22, Fig. 239). Female with supra-anal plate elongate trigonal in outline, its surface interruptedly subsulcate medio-longitudinally;¹⁶⁷ cerci acuminately conical; dorsal ovipositor valves with dorso-external margins not serrulate, ventral valves with proximo-lateral production of ventro-external margins broadly rounded and not at all dentiform; subgenital plate with distal margin broadly subtrigonal with a moderate intervalvar production. Cephalic and

¹⁶⁶ The correlation of this structure with the normal venational pattern of the acridoids is difficult and uncertain.

¹⁶⁷ This is sometimes obsolete distad of the transverse impression.

median femora of males but moderately inflated and tumid; caudal femora surpassing the apex of the abdomen in both sexes, genicular lobes subangulate at the apices, Brunner's organ well indicated; caudal tibiae somewhat shorter than the femora, armed with nine spines on the external and internal margins, with apical one present on each margin; tarsi with equal claws, arolia well developed.

Relationship.—The affinity of this genus to *Methiola* has already been discussed. I would regard it as more generalized in most respects than that genus in spite of the unusual character of the tegmina, which somewhat resemble those of *Kosciuscola*, which I here place at the opposite end of the tribe. However, *Kosciuscola* departs radically from the *Methiolopsis-Methiola* stem of the Praxibulini in many other features, and I regard these dissimilarities as more fundamental and outweighing the apparent tegminal convergence.

Distribution.—Coastal south-eastern Queensland and adjacent extreme north-eastern New South Wales, reaching from the vicinity of Bowen, Queensland, southward to the Tweed River area of north-eastern New South Wales. How far it may extend inland is at present not known, as all available records are from localities which are coastal in position.

Remarks.—But a single species (*geniculata*) of *Methiolopsis* is known.

METHIOLOPSIS GENICULATA (Stål)

Plate 12, Figs. 146-149; Plate 22, Figs. 237-244

P[raxilla] geniculata Stål, 1878, Bihang K. Vetenskapsakad. Handl. 5 (4): 96 (♀; "Northern Australia").

Methiola geniculata Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 103, 104 (Port Curtis and Bowen, Queensland); Sjöstedt, 1931, Ark. Zool. 23A (11): 3, 14 (Brisbane, Queensland); Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 79 (no additional information).

Queensland.—Brisbane; Apr. 1942 (K. H. L. Key) 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra); 10 and 26.i.1948 (K. R. Norris) 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Mt. Coot-tha,¹⁶⁸ Brisbane; May 1942 (K. H. L. Key) 1 ♂, 3 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia); 19.vii.1952 (K. H. L. Key) 6 ♂, 4 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Caloundra;¹⁶⁹ 27.xii.1942 (F. B. Common) 2 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Binna Burra;¹⁷⁰ 1.vi.1942 (F. B. Common) 2 ♂, 4 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia).

¹⁶⁸ About 10 miles due W. (air-line) of Brisbane.

¹⁶⁹ In Canning district, on coast about 50 miles N. of Brisbane.

¹⁷⁰ In the Lamington National Park, about 5 miles slightly W. of N. of Mt. Merino, or about 8 miles due E. of Ladybrook, approximately half-way along a line joining Murwillumbah (N.S.W.) and Beaudesert (Queensland).

New South Wales.—Murwillumbah;¹⁷¹ Mar. 1942 (K. H. L. Key) 4 ♂, 4 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia).

From the evidence later given by Sjöstedt in 1921 it is evident that Stål's original material came from Port Curtis or Bowen, Queensland, although its describer in this, as in numerous other cases involving Philippine as well as Australian species where the exact locality was known to him, gave only a general one, i.e. "North Australia". The sex of the originally described material was given as female, but Sjöstedt shows that in the Brunner Collection, now in Vienna, from which the species was described there were originally one male and four females. Unfortunately Sjöstedt failed to designate either a single type or one of the two places represented as a restricted type locality. Hence we are unable to say from which locality came any or all of the four females, or to pick one or the other of the two localities as the type locality until we know from which came the single male, which has no direct type history, as that sex was originally excluded from consideration.

The recognition of this distinctive genus and species should not be at all difficult, as its peculiar tegminal structure is quite unique. The preceding generic diagnosis presents most of the recognition features of the species of this monotypic genus. The following comments are intended to amplify the characters given in the preceding generic description.

Male.—Mt. Coot-tha, Brisbane, Queensland. July 19, 1952 (K. H. L. Key) (Division of Entomology Museum, C.S.I.R.O., Canberra).

As seen from the dorsum the breadth of the head across the genae and that of the pronotum are subequal, the body slightly broadened at the insertion of the median and caudal limbs, abdomen appreciably narrower with its apex slightly upcurved.

Head with its exposed dorsal length equal to five-sixths that of the pronotum, in profile the occiput is well rounded and decurving cephalad to the moderately declivent fastigial surface; interocular space with its least breadth equal to two-thirds of the greatest overall breadth of the fastigium, excavation of the fastigial disk extending caudad to and over the interocular area.

Pronotum with its median length subequal to its greatest breadth caudad across the lateral lobes, surface of most of the dorsum, of the metazonal section of the lateral lobes and much of the whole ventral third of the latter cribrosely impresso-punctate to substrumosely rugulose in the latter area, that of the lateral lobes rounding dorsad into the dorsum with no definite intervening angulation or carination, in profile the pronotum is faintly sellate, its dorsal line weakly concave; lateral lobes with angle of ventral margin at three-fifths of its length, the portion of the margin cephalad of this angle subconcave, ventro-cephalic angle of margin of lobes rounded obtuse, ventro-caudal angle of same distinctly obtuse-angulate.

¹⁷¹ Coastal portion of extreme north-eastern corner of New South Wales, on Tweed River.

Tegmina with their greatest median breadth equal to half their length; costal margin broadly and regularly arcuate, apex rather narrowly rounded, sutural margin virtually straight except for very brief roundings to the apex and base.

Supra-anal plate faintly broader at its base than its median length, median sulcus with its lateral borders somewhat constricted at distal fourth.

Caudal femora surpassing the apex of the abdomen by a distance subequal to that of the pronotal disk, greatest depth, at proximal fourth, contained slightly more than 3.6 times in the femoral length.

Female.—Mt. Coot-tha, Brisbane, Queensland. July 19, 1952 (K. H. L. Key) (Division of Entomology Museum, C.S.I.R.O., Canberra).

As seen from the dorsum the greatest breadth of the pronotum caudad across the lateral lobes is equal to 1.16 times that across the genae, the greatest breadth of the thorax across the pleura but faintly greater than that across the lateral lobes of the pronotum.

Head with its exposed dorsal length equal to but three-fourths that of the pronotum, in profile the occiput is well rounded but slightly less so than in the male, not quite as strongly decurving cephalad, the fastigio-facial angle somewhat more obtuse and less broadly rounded than in the male, facial line as seen in profile oblique but much less retreating than in the male, fastigial excavation less extensive caudad than in the male; interocular space equal to faintly more than two-thirds of the greatest overall breadth of the fastigium (as 16 to 23).

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂, Brisbane, Queensland	11.2	— ¹⁷²	2.6 ¹⁷³	1.95	7.3
♂, Mt. Coot-tha, Brisbane, Queensland	11.5	5.7	2.77	2.11	7.4
♂, Mt. Coot-tha, Brisbane, Queensland	12.8	5.1	2.93	2.25	8.6
♂, Binna Burra, Queensland	13.6	6.3	2.77	2.28	7.8
♂, Murwillumbah, N.S.W.	11.8	5.8	2.93	2.28	8.1
♂, Murwillumbah, N.S.W.	10.9	— ¹⁷²	2.6	1.87	7.8
♀, Brisbane, Queensland	15.3 ¹⁷⁴	— ¹⁷²	3.5	2.93	9.9
♀, Brisbane, Queensland	20.2	5.7	4.4	3.2	11.5
♀, Mt. Coot-tha, Brisbane, Queensland	16.3	5.0	3.7	3.4	9.6
♀, Mt. Coot-tha, Brisbane, Queensland	19.3	6.5	4.5	3.7	12.0
♀, Binna Burra, Queensland	18.5	5.3	4.2	3.0	9.9
♀, Murwillumbah, N.S.W.	15.4 ¹⁷⁴	6.0	4.0	2.93	10.2
♀, Murwillumbah, N.S.W.	17.9	5.5	4.4	3.4	10.7

¹⁷² Incomplete.

¹⁷³ This is the greatest—not the median—length. The dimension is given in this fashion on account of the median excision of the caudal margin of the disk.

¹⁷⁴ Abdomen somewhat retracted.

Pronotum with its greatest caudal breadth across the lateral lobes subequal to the greatest length of the dorsum (not on median line); surface sculpture essentially as in male, lateral shoulders of the disk moderately evident, rather weaker on the metazona, as seen from the dorsum regularly diverging caudad, their separation caudad equal to 1.6 times that at the cephalic margin, in transverse section the disk of the pronotum is arcuato-tectate; lateral lobes with marginal details as described for the male sex.

Tegmina with their greatest median breadth slightly less than half the tegminal length (as 28 to 61), apex rather sharply rectangulate as seen in lateral view, margins otherwise as in male.

Ovipositor valves relatively deep, the ventral ones particularly, both sets subcompressed and with their apices rather blunted, lateral plates deep, their apices as seen in profile moderately but briefly acute produced.

Cephalic and median femora not at all inflated or tumid; caudal femora surpassing the abdominal apex by approximately half the dorsal length of the head, proportions of caudal femora essentially as in male.

Coloration.—The species exhibits green and brown colour phases, which, as is frequently the case, are more pronounced in the female than in the male sex, and in the former there is also found a greater range in tonal depth in the brown phase than is noted in the male. Representative individuals of the two phases in both sexes show the following colour characteristics:

Male (brown phase).—Base tone sayal brown to snuff brown with that of the caudal femora dull brownish olive, the body rather solidly overlaid with fuscous on the occiput, genae, mandibles, the pronotum and pleura (except as here described), the external face and the genicular extremity of the caudal femora, and the proximal extremity of the caudal tibiae, with longitudinal, lateral, and distad narrowing bars of the same colour on the sides of the abdomen. Face, clypeus, and much of labrum as pale as pale cinnamon, the face finely impresso-punctate with darker; the dark genae shining, antennae pale proximad, becoming infusate distad; eyes cupreous brown, finely speckled. Pronotum with its dorsum dull, the area of the usual post-ocular bars shining like the genae, mesad the lateral lobes are crossed by an arcuate bar of cream-buff of even breadth, this continued over the mesopleura to the base of the median limbs, with a similar but narrower line on the metapleura, both the pleural lines somewhat more pinkish than the pronotal pale bar. Tegmina fuscous with the more dorsal section sometimes somewhat paler and there virtually snuff brown. Dorsum of abdomen of the general colour and relatively pale, moderately contrasted with the darker sides of the abdomen. Cephalic and median limbs brownish olive. Ventral surface of body and ventral sulcus of the caudal femora of the pale base tone with an olivaceous wash. Caudal tibiae dull glaucous blue, deepening distad, spines black tipped.

Male (green phase).—With the pale lines on the pronotum and pleura as in the brown phase of the sex, the pale base colour definitely more greenish, nearer dull green-yellow of Ridgway on the venter, and with the abdominal dorsum

tawny-olive, the face clay-colour, pronotal dorsum and occiput faintly lighter than the post-ocular areas of the head and pronotum, cephalic and median limbs and caudal femora, except for their fuscous genicular extremities, course green (of Ridgway), tegmina and caudal tibiae essentially as in the brown phase.

Female (green phase).—Dorsal surface of head, pronotum, exposed section of the mesonotum, and greater portion of the metanotum biscay green (of Ridgway), face and ventral section of the genae washed with course green, ventral surface of thorax and abdomen, cephalic and median limbs, and caudal femora, except for their fuscous genicular extremities, yellow-green, the cephalic genicular lobes of the median femora narrowly fuscous, the external face of the caudal femora progressively darkening dorsad to parrot green near the dorso-external carina; dark post-ocular bars mummy brown to fuscous and evident continuously to the cercal bases, a short bar of the same colour extending briefly from the eye margin ventro-caudad across part of the genae. Eyes cupreous brown, in part at least finely sprinkled with cupreous; antennae buffy, from distal third on with alternate articles mummy brown and distal section solidly of the latter colour. Pronotum with pale lateral arcuate bars as in the males, of pale green-yellow, in part contrasted ventrad with a short subrectangulate spot of mummy brown, most of the ventral section of the lateral lobes of the colour of the pronotal dorsum. Pleura with oblique pale bars as described for the male. Tegmina with more dorsal section ochraceous-tawny, more lateral one cinnamon-brown with the anastomosing venation outlined in ochraceous-tawny. Dorsum of abdomen and more dorsal terminal appendages ochraceous-tawny to tawny. Caudal tibiae with their proximal extremity fuscous, remainder glaucous blue, faintly greenish in proximal third, spines whitish with fuscous tips.

Female (brown phase).—Pattern as in the green phase of the same sex, with the base colour ranging from as dark as mars brown to as light as ochraceous-tawny, the overlaid dark pattern brownish fuscous to blackish fuscous; ventral surface and ventral sulcus and ventro-external face of the caudal femora sulphur yellow to citrine; pale bars on lateral lobes of the pronotum and pleura clay colour to cinnamon-buff, on the lateral lobes often involving the whole ventral section of the same part. Antennae annulate as in green phase, but this is less contrasted and is continued more distinctly toward the apices. Tegmina with their tones as in the green phase of the female. Cephalic and median limbs of the base tone sprinkled with fuscous. Caudal femora with dorsal faces cinnamon to sayal brown, external face ranging individually from dark greenish-olive to fuscous, paling narrowly ventrad to the colour of the ventro-external face, genicular extremity fuscous; caudal tibiae essentially as in the green phase female.

Both the green and brown phases of both sexes are present in the Mt. Coot-tha representation, that from Brisbane has a green male and both phases in the female sex. The Binna Burra female individuals are all in the brown phase, the males approaching but not fully typical of the green one. The Murwillumbah females are all brown phase, the males green phase. The most extreme green phase females are those from Brisbane and one from Mt. Coot-tha, while the

brown phase females from Mt. Coot-tha, Binna Burra, and Murwillumbah show, for each locality, an appreciable range in tonal depth, with the darker individuals as a whole less contrasted.

Distribution.—That of the genus.

Genus METHIOLA Sjöstedt

Methiola Sjöstedt, 1920, Ark. Zool. 12 (20): 16, 22; Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 84, 103 (in part only); Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 60, 79 (in part only).

Genotype (by monotypy) *Methiola picta* Sjöstedt.

Sjöstedt erected this genus solely on the type species, but later (1921) broadened it to include Stål's *Praxilla geniculata*, which, however, is here separated as the sole species of the new genus *Methiolopsis*. The more obvious features which readily distinguish *Methiolopsis* from *Methiola* are summarized in the discussion of the former and utilized in the preceding key to the genera.

Generic description.—Brachypterous. Body very weakly fusiform in the female, somewhat less so than in *Methiolopsis*, in the male subcylindrical; surface much as in *Methiolopsis*. General form of head essentially as in *Methiolopsis*; fastigium as seen from dorsum as in *Methiolopsis*, with its overall breadth exceeding its length cephalad of the least interocular space, in profile with the fastigiofacial angle slightly sharper and less rounded than in *Methiolopsis*, encompassing fastigial margins and disk impression of fastigium as in *Methiolopsis*, no cephalic median carina present; frontal costa evident over the whole face in both sexes, moderately sulcate throughout, narrowing evenly dorsad of median ocellus in both sexes, in the female not as broad in most of this area as in *Methiolopsis*, carination of lateral borders of costa well marked and these virtually subparallel ventrad of the median ocellus; eyes in prominence and general outline as in *Methiolopsis*; antennae moderately long, composed of 21-22 articles, in the male well surpassing the combined length of the head and pronotum, in the female not quite equalling the same. Pronotum somewhat longer than the dorsum of the pronotum in male, as seen from dorsum, subcylindrical with ventro-caudal portion of lateral lobes weakly diverging, in female the whole pronotum is appreciably expanding caudad as seen in dorsal view, but less so than in the female of *Methiolopsis*, cephalic margin of disk low arcuate, caudal margin of same as a whole obtuse-angulate emarginate, more shallowly so in the female than in the male; median carina low but distinct, equally evident in both sexes, lateral shoulders of disk subobsolete in male, indicated by a weak angulation in the female; all transverse sulci cutting the median carina in the male, except for the principal one this condition is less definite or not evident in the female; lateral lobes as in *Methiolopsis* but slightly more longitudinal. Tegmina ovoid, in both sexes reaching to or briefly surpassing the caudal margin of the proximal abdominal tergite, their greatest breadth mesad, surface with a cribrosely anastomosed venational pattern with few clearly defined longitudinal elements, the most evident of these in the position of the angulate ridge seen in

Methiolopsis, but this merely suggests and by no means approaches the structural tectation seen in *Methiolopsis*. Wings rudimentary and completely concealed by the tegmina. Prosternal spine as in *Methiolopsis*. Interspace between mesosternal lobes sublongitudinal in the male, in the female subquadrate broadening caudad; metasternal lobes contiguous in the male, rather narrowly separated in the female. Ultimate abdominal tergite of male with very small, rudimentary, and subobsolete rounded furcula; supra-anal plate of that sex rounded subtrigonal in outline with a weak sublabiation at the apex, sculpture of surface of plate as in *Methiolopsis*; cerci simple, conical with the distal section definitely aciculate, in length surpassing the apex of the supra-anal plate; male subgenital plate bluntly conical, its dorso-lateral margins reaching nearly to the apex, V-convergent and joining shortly before the latter and thence continued distad as a single carinate ridge; epiphallus of male internal genitalia with the lophi developed as erect, subcompressed, acute recurved corniform processes, which are longitudinally placed, ancorae developed as short recurved hooks placed at the lateral third of the proximal margin of the epiphallus (see Plate 22, Fig. 248). Female with supra-anal plate, cerci, and ovipositor valves essentially as described for *Methiolopsis*; subgenital plate with distal margin angulate mesad with concave emarginations on each side ventrad of the ventral ovipositor jaws. Cephalic and median femora of male somewhat more tumid and inflated than those of *Methiolopsis*; caudal femora equalling or surpassing the apex of the abdomen in the female, definitely surpassing it in the male, Brunner's organs well indicated; caudal tibiae somewhat shorter than the femora, armed with nine spines on both the external and internal margins, with the apical present on each; tarsi with equal claws, arolia well developed.

Relationship.—The genera *Methiola* and *Methiolopsis* are closely related, and together constitute a well-marked phylogenetic line of the Praxibulini.

Distribution.—The Atherton Plateau and adjacent areas of northern Queensland.

Remarks.—The genus contains but a single species (*picta*), which is divisible into two subspecies.

METHIOLA PICTA Sjöstedt

This species breaks into two relatively well-marked subspecies, one of which is apparently limited to the Atherton area and the neighbourhood of Cairns (*M. p. picta*), while the other (*M. p. gemmata*) is known only from Tully Falls on the upper course of Tully River, a matter of not more than 20 miles from the nearest locality from which the typical form has been reported. Probably *M. p. gemmata* frequents conditions somewhat different from those in which the other component of the species occurs.

KEY TO FORMS OF METHIOLA PICTA

1. Frontal costa more deeply sulcate in both sexes. Cephalic and median femora of male appreciably heavier and more inflated. Tegmina of

female proportionately broader and less attenuate. (Vicinity of Atherton Plateau, Queensland.) *picta picta* Sjöstedt
 Frontal costa less deeply sulcate in both sexes. Cephalic and median femora of male not as heavy and less inflated. Tegmina of female proportionately narrower and more attenuate. (Tully Falls, Queensland.) *picta gemmata* n. subsp.

METHIOLA PICTA PICTA Sjöstedt

Plate 12, Figs. 150-153; Plate 22, Figs. 245-251; Plate 23, Fig. 252

Methiola picta Sjöstedt, 1920, Ark. Zool. 12 (20): 23, text-fig. 2 (♂, ♀; Cedar Creek, Queensland¹⁷⁵); Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 103, 104 (Cedar Creek, Heberton, Atherton, and Evelyne,¹⁷⁶ Queensland); Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 79 (no additional information).

Queensland.—Kuranda;¹⁷⁷ 21-31.i.1925 (F. P. Dodd) 1 ♂, 3 ♀ (Academy of Natural Sciences of Philadelphia).

The original material of *picta* (i.e. *picta picta*) is in the Stockholm Museum, and consists of a single pair from Cedar Creek. As no holotype or lectotype was indicated by Sjöstedt then or subsequently, I am here selecting the female of the original pair, and from which the original figures were drawn, as the lectotype.

Sjöstedt's original description of *picta* consisted of but seven lines in addition to the measurements, and nothing was added to this in his 1921 treatment. Therefore it seems incumbent to add a fair description to present features of typical *picta*, and also to serve as a comparative basis for the here-described *M. picta gemmata*.

Male (Kuranda, Queensland).—Head with its exposed dorsal length equal to three-fourths the overall length of the pronotal disk, in profile the dorsal outline of the head is as in *Methiolopsis geniculata*, fastigio-facial angle somewhat more prominent than in latter when seen in profile, less rounded and more obtuse-angulate; interocular space with its least breadth equal to half the overall breadth of the fastigium, excavation of the fastigial disk extending caudad to and over the interocular area; frontal costa with the carinate lateral margins well elevated, continuous, and subparallel except for a brief convergence dorsad to the fastigio-facial juncture, sulcation of costa relatively deep, V-shaped in section dorsad of the median ocellus, concavely rounded in section ventrad of the same.

Pronotum with its median length subequal to its greatest caudad breadth across the lateral lobes, sculpture of the pronotal surface very much as described

¹⁷⁵ There are a number of localities bearing this name in Queensland, but most of these are in an area of the State where this species is not known to occur. I find that in his study of the scolopendrids and scorpions collected by Mjöberg, who secured the original material of *picta*, Kraepelin (Ark. Zool. 10 (2): 4 (1916)) states that Cedar Creek is in North Queensland in the environs of Cairns.

¹⁷⁶ See Vol. II, p. 162, footnote 247.

¹⁷⁷ About 12 miles in an air-line NW. of Cairns, at a higher elevation.

for the male sex of *Methiolopsis geniculata*, the passage of the lateral lobes into the dorsum as in that species; lateral lobes with their outline much as in *Methiolopsis* but their caudal margin is less sharply and less deeply concave.

Tegmina with their greatest median breadth equal to slightly less than half their length (as 51 to 22); costal margin broadly arcuate, apex subtruncately rounded, sutural margin nearly straight, but weakly rounding to apex and base.

Supra-anal plate very faintly broader at its base than its median length, distad converging lateral margins of plate with a well-marked but rounded and shallow preapical notch which cuts off the median distal sublabiation; sculpture of surface with transverse impression well-marked, median sulcation slightly more pronounced than in *Methiolopsis* and similarly constricted at distal fourth; cerci slightly more aciculate and attenuate in distal third than in *Methiolopsis*.

Caudal femora surpassing the apex of the abdomen by a distance somewhat less than the medio-dorsal length of the pronotum, greatest depth, at proximal fourth, contained four times in the femoral length.

Female (Kuranda, Queensland).—General form somewhat more attenuate than in the same sex of *Methiolopsis*, hence faintly less fusiform.

Head and pronotal features given above under genus.

Tegmina with their greatest median breadth somewhat less than half their median length (as 29 to 65); margins as in male sex.

Supra-anal plate essentially as in *Methiolopsis* except that the lateral margins converge distad somewhat less acutely than in that genus; cerci, as in male, somewhat more attenuate and aciculate distad than in *Methiolopsis*; subgenital plate with the rounded disto-lateral lobations of the margin well cut off by subacute emarginations from the disto-median trigonal production, the ventral surface of which latter is deplanate.

Caudal femora surpassing the apex of the abdomen by a distance approximately equal to about half the dorsal length of the pronotum, their greatest

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂, Cedar Creek, Queensland, <i>type</i> , ex Sjöstedt	14.0	7.0 ¹⁷⁸	3.0	2.0	8.0
♂, Sjöstedt's 1921 meas.	14.0	7.0	2.7–3.0	2.0–2.3	8.0–8.6
♂, Kuranda, Queensland	15.6	7.0	3.1 ¹⁷⁹	2.7	9.6
♀, Cedar Creek, Queensland, <i>allotype</i> , ex Sjöstedt	20.0	6.0	3.8	3.3	11.0
♀, Sjöstedt 1921 meas.	20.0	6.5	3.8	3.0–3.3	11.0–12.0
♀, Kuranda, Queensland	19.0	6.6	4.2 ¹⁷⁹	3.4	12.2

¹⁷⁸ This measurement was supplied subsequently by Sjöstedt in 1921, and may not have been from the type.

¹⁷⁹ This is overall, not median, length.

depth, at proximal fourth, with essentially the same ratio to length as in the male sex (as 19 to 79).

Coloration.—The very limited available series of the typical subspecies of *M. picta* does not exhibit definite dichromatism, but a larger representation conceivably may, as in the female sex of *M. picta gemmata* it is known that there is dichromatism in the coloration of the caudal femora. General tone of dorsal and lateral surfaces sayal brown to dresden brown (latter only in the single male seen); ventral surface and face much paler, ranging from cinnamon-buff to tawny-olive; dark pattern of snuff brown to clove brown composed of the following elements, (1) post-ocular bars extending over the dorsal section of the lateral lobes, involving most of the pleura and gradually becoming obsolete on the proximal half of the sides of the abdomen, (2) an infra-ocular genal bar of variable extent and emphasis, but separated from the post-ocular bar by a pale interspace of variable width, (3) an infuscation of the ventral border of the lateral lobes of the pronotum,¹⁸⁰ and (4) by a marked suffusion of the genicular arches and most of the area of the genicular lobes of the caudal femora and the proximal extremity of the caudal tibiae. The pale areas on the sides of the head between the post-ocular bars and the genal darkening, across much of the ventral sections of the lateral lobes of the pronotum, and the pale dash on the pleura range in tone from chamois to clay colour. Antennae dull brownish glaucous proximo-dorsad, becoming infusate distad, as well as ventrad, with some indication of alternation of light and dark articles.¹⁸¹ Eyes buckthorn brown to snuff brown with a cupreous sheen. In the single male the dark post-ocular bars are less clearly defined dorsad than in two of the three females, while the contrast of the pale areas of the lateral lobes of the pronotum is more pronounced in the single male than in any of the three females. Tegmina with their sutural third of the colour of the dorsal surface of the pronotum, the remainder (more costal in position) somewhat darker and more infusate. Male with the cephalic and median limbs green-yellow, the tibiae slightly more greenish, caudal femora green-yellow proximad, this evenly passing distad into light coral red, the greater part of the genicular extremity, as already noted, infusate, caudal tibiae and tarsi pale glaucous, the spines black tipped. Females with the cephalic and median limbs ranging from as light as mignonette green (of Ridgway) to as infusate as brownish olive,¹⁸² slightly paler ventrad on the median femora, caudal femora with pattern as described in the male, with, however, the external pagina deeper greenish and less yellowish than the dorsal and ventral aspects, the paginal tone proximad ranging from cource green to buffy citrine and its darkened distal continuation dividing the coral red into dorsal and ventral sections; caudal tibiae and tarsi coloured as in the male.

Distribution.—The typical subspecies of *Methiola picta* is known only from the general area of the Atherton Plateau, northern Queensland, and extends

¹⁸⁰ This is not indicated in one of the three females before me.

¹⁸¹ Antennae are lacking in half the specimens, and this condition is evident only in one female.

¹⁸² This is but one of the three females now studied.

at least as far northward as Kuranda, north-west of Cairns. Exactly where it passes into *M. p. gemmata*, which apparently is its more southern subspecies, remains to be determined.

METHIOLA PICTA GEMMATA¹⁸³ n. subsp.

Plate 12, Figs. 154 and 155; Plate 13, Figs. 156 and 157; and Plate 23, Figs. 253 and 254

This strikingly beautiful little grasshopper is known to me only from a series taken at Tully Falls, Queensland, a locality not far removed from others from which *picta* has been recorded. However, whether all the Atherton Tableland localities from which *picta* has previously been reported are inhabited by what I regard as typical *picta*, on the basis of Kuranda individuals, remains to be determined. The present form seems clearly separable from the small Kuranda series before me by having the frontal costa in both sexes somewhat less deeply sulcate, by the less inflated and not as heavy form of the cephalic and median femora of the male, and by the tegmina of the female being proportionately narrower and more attenuate.

Type.—♀; Tully Falls,¹⁸⁴ Queensland. December 28, 1945 (K. R. Norris) (Division of Entomology Museum, C.S.I.R.O., Canberra).

The following features are largely comparative with those given in the preceding description of *M. p. picta*.

Fastigio-facial angle as seen in profile with outline narrowly rounded sub-rectangulate, rather than distinctly more obtuse-angulate as in *M. p. picta*. Frontal costa with its breadth as in typical *picta*, but its margins are less sharply continuous ventrad to the supra-clypeal suture, and its median impression as a whole is more shallowly impressed.

Pronotum as seen from the dorsum slightly more longitudinal than in *M. p. picta*, its greatest median length slightly greater than its greatest caudal breadth across the lateral lobes (as 30 to 28); second transverse sulcus as distinctly severing the median carina as does the principal one, lateral lobes in consequence slightly more longitudinal.

Tegmina with their greatest median breadth very appreciably less than half the tegminal length (as 30 to 75), outline of apex more rounded and not as subtruncate.

Abdominal appendages as in the female of *M. p. picta*.

Femora as in the same sex of *M. p. picta*.

Allotype.—♂; same data as type (Division of Entomology Museum, C.S.I.R.O., Canberra).

Differing from the preceding description of the male sex of *M. p. picta* in the following noteworthy respects.

¹⁸³ i.e. *ornamented with gems*, in allusion to the contrasting and striking pattern of the sides of the head and pronotum of the male.

¹⁸⁴ See Vol. II, p. 45, footnote 81.

Frontal costa slightly narrower than in *p. picta*, a little more shallowly sulcate and with the emphasis of the lateral margins less decided and weaker near the supra-clypeal suture; fastigio-facial angle in profile slightly less prominent.

Tegmina slightly narrower and more attenuate, but this is not as readily evident as in the female sex.

Cephalic and median femora appreciably less inflated and not as bullate as in the male of *M. p. picta*, this being evident in both dorsal and lateral views.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂, Tully Falls, Queensland, <i>allotype</i>	15.6	6.8	3.21 ⁸⁵	2.77	9.7
♂, Tully Falls, Queensland, <i>paratype</i>	16.0	7.0	3.0	2.60	10.1
♀, Tully Falls, Queensland, <i>paratype</i>	20.0	6.0	3.9	3.9	11.7
♀, Tully Falls, Queensland, <i>type</i>	21.0	7.3	4.4	4.4	12.7
♀, Tully Falls, Queensland, <i>paratype</i>	25.0	7.4	5.3	4.4	14.5

Coloration.—As already noted in the colour description of *Methiola picta picta* the present subspecies exhibits definite dichromatism in the coloration of the caudal femora of the female, which is discussed at greater length below. The male sex is essentially the same in pattern as that sex of the typical form, but is more brilliantly and more contrastingly marked. The base tone of the dorsum of the head and pronotum in the male ranges from as pale as light brownish olive (the allotype of this tone) to as dark as bister; the pale areas on the genae and the lateral lobes of the pronotum are more pronounced and more strongly contrasted than in *M. p. picta*, lighter and cream-buff in tone, while the caudal femora have their variegated pattern more decided and more brilliant, the proximal green—as well as that of the cephalic and median limbs—lime green, shading on the proximal section of the external pagina to biscay green, while the preapical annulation is rather deep coral red. In the female the base tone of the dorsal surface of the head and pronotum and the dorsum of the abdomen ranges from as pale as tawny-olive (the type of this tone) to as dark as light cinnamon-brown. The caudal femora of the female in one extreme are coloured as in the male, with a decided green proximal section and a coral red pregenicular annulus, while the opposite extreme (which includes the type) has no indication of the coral red annulus, has the external face of the pagina solidlyummy brown, the dorsal surface cinnamon-rufous darkening to kaiser brown distad, while the proximal half of the ventral sulcus and of the ventro-external face are clear dull green yellow (of Ridgway), as is the venter of the thorax and the abdomen. Of the four females of *M. p. gemmata* before me, two females have their caudal femora without the coral red pregenicular annulus, and the external pagina solidly dark, two have the annulus well marked, while

¹⁸⁵ Median, not lateral, length of dorsum.

the other three show a gradual passage between the extremes. All of the males have the coral red pregenicular annulus of the caudal femora pronounced, but in some it is somewhat brighter in tone than in others.

Distribution.—Known only from the type locality. Possibly of broader distribution along the escarpment bordering the Atherton Plateau, where typical *M. picta picta* occurs. However, we do not know whether all the material previously reported as *M. picta* is the typical form of the species (as is here assumed), or whether from some of the localities the representation may not be *M. p. gemmata*, or intermediate between the two races.

Material examined.—24; 17 ♂, 7 ♀.

Queensland.—Tully Falls; 28.xii.1915 (K. R. Norris) 17 ♂ (*allotype* and *paratypes*), 7 ♀ (*type* and *paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia).

Genus PRAXIBULUS I. Bolivar

Praxilla Stål, 1878, Bihang K. Svenska Vetenskapsakad. Handl. 5 (4): 49, 95. (Not of Reichenbach, 1854.)

Praxibulus I. Bolívar, 1906, Bol. R. Soc. Españ. Hist. Nat. 6: 393; Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 84, 101; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 60, 76.

Genotype (by selection of Kirby, 1910¹⁸⁶) *Praxilla laminata* Stål.

The genus *Praxibulus* is the most diverse member of the present tribe, although it is limited in distribution to south-eastern Australia, and does not reach Tasmania. Three species have been referred to it in the past, i.e. *laminatus* and *latipennis* of Stål, and *ulnaris* of Sjöstedt, of which *latipennis* is here relegated to synonymy under *laminatus*, and *ulnaris* is considered to represent a geographic subspecies of *laminatus*. The very considerable representation now available—many times that previously available of the genus—however, makes evident the components of *Praxibulus* number at least 10, 8 of which are here first described, 7 as full species, and 1 as an additional geographic subspecies of the plastic genotypic species *laminatus*.

The components of *Praxibulus* fall naturally into five sections or species-groups as follows:

Insolens species-group—containing only *P. insolens* n. sp.

Carnei species-group—containing *P. carnei* and *nexilis* n. sp.

Galeritus species-group—containing *P. galeritus* and *duplex* n. sp.

Laminatus species-group—containing *P. laminatus*, made up of three subspecies, i.e. *l. laminatus* (Stål), *l. ulnaris* Sjöstedt, and *l. actus* n. subsp., and *exsculptus* n. sp.

Triangularis species-group—containing only *P. triangularis* n. sp.

¹⁸⁶ Syn. Cat. Orth. 3: 397.

The *insolens* species-group is apparently the most primitive, and more nearly approximates *Laxabilla* than any of the others, with the *carnei* species-group standing next to it in the degree of differentiations from the members of the more dominant *laminatus* species-group.

Relationship.—While *Praxibulus* is more nearly related to *Kosciuscola* in some features of its morphology than it is to the other components of the tribe, it is widely distinct from that genus in others. The tegminal pattern of the female is different from what we find in the related genera, approached only in *Methiolopsis*, and of a very distinctive type. The specialized proximal crest of the dorsal surface of the male supra-anal plate has no analogue in the other genera of the tribe, and the pattern of the epiphallus of the male internal genitalia also is well distinct from that of *Kosciuscola*, yet with basic similarities. Apparently the two genera developed at a time considerably in the past, definitely pre-Pleistocene, I believe, with their present distributions a reflection of Pleistocene controls.

Generic features.—Size relatively small to medium; brachypterous, form in male of average build, in female appreciably stouter, in most species subfusiform as seen from dorsum; surface relatively smooth except for impresso-punctations on dorsum and areas of the lateral lobes of the pronotum, and sparsely on frontal costa. Head with face arcuately reclinate, frontal costa at least in part sulcate, supplementary facial carinae becoming poorly marked ventrad, genae smooth; fastigium rounded or obtuse-angulate in outline as seen from dorsum, its dorsum broader in the male than in the female, shallowly to moderately impressed mesad, fastigio-facial angle moderately to narrowly rounded; eyes but little prominent as seen from dorsum, faintly more evident in the male than in the female; antennae filiform, shorter than the combined length of the head and pronotum. Pronotum subcylindrical to subquadrate in male as seen from dorsum, broadening caudad in female (latter least evident in *insolens* and *carnei* species-group), lateral and median carinae of disk well marked; cephalic margin of disk subarcuate, caudal margin of same subtruncate to obtuse-angulate, rarely emarginate mesad; three transverse sulci well impressed on disk, the first not evident on the lateral lobes, latter with a well-marked cephalic intra-marginal sulcus not evident on the dorsum, prozona of latter longer than metazona; lateral lobes with length dorsad and greatest depth subequal or faintly longer than deep, ventral margin obtuse-angulate, caudal one obliquely concave to sinuate-concave, ventro-caudal angle obtuse, usually roundly so. Tegmina ovate in outline in male, subquadrate in female, not equal to pronotal dorsum in length, width in male somewhat more than half their length, in female averaging subequal to length, apices in male well rounded, often subangulate disto-caudad, in female arcuato-truncate, similarly somewhat subangulate disto-caudad; principal longitudinal venation elevated and conspicuous, especially the anal vein, accessory longitudinal and cross-nervures well developed but somewhat irregular, and never as elevated as the principal elements, aerolation thus rather irregular, particularly in the female sex. Wings rudimentary, non-

functional, completely hidden under tegmina. Prosternal process suberect, well marked, sublamellate, transverse, varying specifically in exact form, interspace between mesosternal lobes cuneate or longitudinal to subquadrate with the lateral margins straight to arcuate, narrower than one of the mesosternal lobes; metasternal lobes well separated (*insolens*) to subattingent in male, narrowly separated in female. Ultimate abdominal tergite of male without furcula. Male supra-anal plate in general outline subtrigonal, narrowing distad, distal two-thirds of dorsal surface with a characteristic pattern of longitudinal raised welt-like ridges, which are conspicuously and contrastingly black in colour, these consisting in general of a median pair and a pair which are marginal in position, all converging distad, their exact length and degree of emphasis occasionally variable in individuals of the same species, and usually of a somewhat different facies in the various species, at proximal third of length of plate there is developed a transverse elevated and similarly contrastingly coloured structure, which I am referring to in the treatment of this genus as the "proximal crest", as in all the species except the generalized *insolens* and the divergent *exsculptus* it is produced mesad into an erect specialized structure, which ranges in outline from a linguiform process, through quadrate forms and transversely arcuate ones to an opposite trigonal extreme, and in most species this structure is flanked laterad on the proximal crest by low rounded lobules, which I have termed "lateral lobules"; cerci of male simple, somewhat flattened vertically in proximal section, straight and tapering or sublamellate proximad and evenly narrowing distad, or incurving distad, the apices always subacute or acute; subgenital plate of male rounded or subacuminate distad, rarely emarginate at apex (in *triangularis*); female supra-anal plate trigonal in outline, shallowly divided in two transversely by a usually weak arcuate impression; female cerci simple, styliform, tapering, not surpassing the apex of the supra-anal plate; ovipositor valves relatively short, of general acridoid type; female subgenital plate with distal margin differing somewhat in outline detail in certain species. Caudal femora with carinae simple and entire, paginal pattern regularly impressed, supra-genicular angles not produced, genicular lobes rounded distad; caudal tibiae with extensor margins simple and non-ampliate, marginal spines 9-11 on external and 8-10 on internal margin, both series with an apical spine, which is included in the above count, internal distal spurs twice the length of the external ones; caudal tarsi relatively short, equal to not quite one-third the caudal tibial length, metatarsus somewhat expanded and flattened dorsad, its length slightly greater than the third article, tarsal claws equal in length, arolium well developed.

Epiphallus of male internal genitalia (e.g. *P. laminatus laminatus*) with ancorae developed as short recurved hooks, with the lateral plates of the epiphallus¹⁸⁷ vertical shoulders curving cephalad, while the lophi¹⁸⁷ are transversely disposed, narrow and relatively low, largely straight cariniform rims,

¹⁸⁷ See Roberts, Proc. Acad. Nat. Sci. Philad. 93: 218, 243 (1941).

their internal sections obliquely bent meso-caudad and not crossing the bridge of the epiphallus (see Plate 24, Fig. 311).

Discussion.—In *Praxibulus* we find details of the male external genitalia of greatest usefulness in distinguishing the various members of the genus, and particularly those of the supra-anal plate and of the cerci. The females are much more difficult to distinguish, so much so that I have refrained from attempting to make a key to the forms based on both sexes. Females have been studied, described, and figured, and points for the recognition of various species in that sex have been discussed, but making a key which included them was found to be impractical, owing to the fine shading of differences. However, the fastigial form, marginal details of the subgenital plate of that sex, and certain other features show subtle differences, which are discussed under the individual species, but can hardly be drawn upon for alternative statements in a dichotomous key. The character of what I am here referring to as the proximal crest of the supra-anal plate of the male¹⁸⁸ has been of the most importance in distinguishing the various species. In its exact form, however, there is some plasticity in various species, here discussed in each case under the respective forms. Cercal form in the male, also of the subgenital plate in the same sex, followed by details of the fastigium and of the frontal costa are also of value in this order in separating the species.

In *Praxibulus* we find green and brown phases present, although the former is infrequent in the male sex. Also in some forms there is a considerable range in emphasis of various elements in the green phase, a tendency discussed under the different entities. All members of the genus are brachypterous, and although there is some little difference in the exact outline of the subquadrate tegmina, they depart but little from a generalized type.

Distribution.—Extending from elevated areas of north-eastern New South Wales south to the coastal areas of eastern Victoria, and from central and south-eastern coastal New South Wales westward to the Nandewar and Liverpool Ranges, the eastern border of the Darling-Murray plains (Wellington^{188a} and Wagga Wagga), N.S.W., and the vicinity of Melbourne, Vic.¹⁸⁹ The genus is thus seen to be largely partial to upland or mountainous areas, reaching coastal sections chiefly as southern districts are approached, and disappearing as the lower and warmer Darling-Murray plains are reached. All of the five species-groups except the *laminatus* one inhabit definite areas, these being:

¹⁸⁸ See p. 131.

^{188a} This locality is along the Macquarie River between Dubbo and Orange, about 25 miles SE. of Dubbo. The single specimen seen from this locality is an immature female which is not specifically determinable.

¹⁸⁹ The type locality of the genotypic species (*laminatus*) was given originally as "Lord Howe Island". Along with other authors I think it is exceedingly doubtful that this genus occurs on that oceanic island, which is more than 300 miles east of the coast of New South Wales. Until there is corroborating evidence as to the locality it is wisest to regard the specimen as being mislabelled, since as far as is known today the genus never even reached Tasmania, which faunistically is very close to the Australian mainland. Also a flightless genus *Praxibulus* is hardly likely to have reached Lord Howe Island adventitiously.

Insolens species-group. Mountains of the Australian Capital Territory.

Carnei species-group. Victorian Alps and mountains of north-eastern New South Wales.

Galeritus species-group. Coastal south-eastern New South Wales and eastern Victoria.

Laminatus species-group. Covering approximately the entire range of the genus.

Triangularis species-group. Barrington Tops and Blue Mountains, N.S.W.

KEY TO THE FORMS OF PRAXIBULUS

This key is based solely on the male sex, as the females are so similar in most respects that it is virtually impossible to present in words the graduated differences between them, which, however, are discussed under the individual species.

1. Supra-anal plate of male with its surface sculpture in the position of the usual marked proximal crest¹⁹⁰ consisting of a low transverse ridge, this becoming obsolete laterad (see Plate 23, Fig. 257). Cerci of male straight, hardly compressed or sublamellate in proximal two-thirds, subaciculately tapering distad (see Plate 23, Figs. 257 and 258). Subgenital plate of male bluntly pointed distad of margin of anal chamber (see Plate 23, Figs. 257 and 258). (Mountains of Australian Capital Territory.) *insolens* n. sp.

Supra-anal plate of male with a distinct proximal crest,¹⁹⁰ which bears an erect or suberect transverse median structure, this variously developed as a lamellate plate or trigonal production, or (in *P. exsculptus*) the crest is reduced to three elevated transversely disposed nodes, but not as the low ridge seen in *P. insolens*. Cerci of male straight or incurved, compressed or sublamellate in proximal two-thirds, less aciculately tapering distad than in alternative. Subgenital plate of male variously developed

2

2. Supra-anal plate of male with proximal crest developed mesad into a trigonal production (see Plate 24, Fig. 290). (Cerci of male sublamellately compressed proximad, acuminate apices relatively short, the cerci in their entirety incurved (see Plate 24, Fig. 288). Subgenital plate of male with distal margin mesad occasionally shallowly emarginate, no apical section present distad of margin of anal chamber (see Plate 24, Fig. 288). (Barrington Tops and Blue Mountains, New South Wales.) *triangularis* n. sp.

Supra-anal plate of male with proximal crest otherwise developed 3

3. Proximal crest of male supra-anal plate with median production arcuately rounded in transverse outline or arcuate and apically emarginate, or forming the median of three nodes composing the proximal crest (in *exsculptus*), but not an erect sublinguiform structure 7

¹⁹⁰ See p. 131 for explanation of this term.

- Proximal crest of male supra-anal plate elevated mesad into an erect sublinguiform lamellation 4
4. Subgenital plate of male broadly rounded distad as seen in dorsal aspect 5
- Subgenital plate of male more produced distad as seen in dorsal aspect, the apex more narrowly rounded 6
5. Cerci of male straight, not incurved, as seen in profile tapering but little in proximal two-thirds, apices twisted into a horizontal plane (see Plate 23, Figs. 264 and 265). Median production of proximal crest of male supra-anal plate transversely rectangulate in outline, its lateral margins shorter proportionately, lateral basal shoulders well marked. (Victorian Alps.)
carnei n. sp.
- Cerci of male strongly incurved, in profile evenly tapering throughout (see Plate 23, Figs. 268 and 269). Median production of proximal crest of male supra-anal plate subquadrate in outline, its lateral margins longer proportionately, with virtually no lateral basal shoulders (see Plate 23, Fig. 277). (New England Plateau area of New South Wales.) *nexilis* n. sp.
6. Fastigium sharper and more produced as seen from the dorsum. Frontal costa of male more appreciably narrowed dorsad at fastigio-facial angle. Cerci of male strongly inbowed subsigmoidally, in profile deep and subequal except in distal fourth, which is sharply acuminate. Median production of proximal crest of male supra-anal plate with lateral margins subparallel and apex entire. (South-eastern coastal New South Wales.)
galeritus n. sp.
- Fastigium blunter and broader proportionately as seen from the dorsum. Frontal costa of male hardly at all narrowed dorsad at fastigio-facial angle. Cerci of male moderately incurved, not as deep as in alternative, in profile moderately narrowing distad in proximal half, more sharply thence to apex. Median production of proximal crest of male supra-anal plate with lateral margins more sigmoidally converging distad to the apex, which is bilobately emarginate. (Victoria.) *duplex* n. sp.
7. Proximal crest of male supra-anal plate marked chiefly by three transversely disposed nodes, the median in the position of the suberect production found in most of the species of this genus (see Plate 25, Fig. 318). (Raised pattern of the more distal portion of the supra-anal plate less extensive than usual in the genus.) (Elevated areas of north-eastern New South Wales.) *exsculptus* n. sp.
- Proximal crest of male supra-anal plate with its outline sigmoidally elevated mesad into a rounded lobation, which is well separated from the more lateral lobules, the median lobation occasionally emarginate at its rounded apex 8
8. Median lobation of proximal crest of male supra-anal plate narrower and less elevated than in the alternate category (see Plate 23, Fig. 317). (Vicinity of Liverpool Range, New South Wales.)
laminatus actus n. subsp.

Median lobation of proximal crest of male supra-anal plate broader and more elevated than in the alternate category (see Plate 24, Figs. 309 and 310) 9

9. Median lobation of proximal crest of male supra-anal plate proportionately higher, narrower, and more mammiform, its rounded apex entire, lateral basal lobules more broadly rounded. Subgenital plate of male moderately acuminate at apex as seen from dorsum. (Coast and mountains of Victoria.) *laminatus ulnaris* Sjöstedt

Median lobation of proximal crest of male supra-anal plate proportionately broader, and more evenly arcuate in outline, the apex occasionally, but not usually, emarginate, lateral basal lobes smaller and more angular. Subgenital plate of male not as acuminate distad as seen from dorsum. (Most of south-eastern New South Wales back from immediate coast.) *laminatus laminatus* (Stål)

PRAXIBULUS INSOLENS¹⁹¹ n. sp.

Plate 13, Fig. 162; Plate 14, Figs. 163-165; Plate 23, Figs. 262-265, 271-273

In the male sex this species can at once be distinguished from the other members of the genus by the more generalized form of the supra-anal plate, which has the usual proximal crest of this genus reduced to a relatively low ridge, which is somewhat higher mesad and subobsolete laterad (see Plate 23, Fig. 257), while the more distal section of the plate has a medio-longitudinal shallow sulcation bordered laterad by moderately evident substrumose borders. The straight type of male cerci occurs elsewhere in the genus only in the otherwise very different *P. carnei*. The whole form of the male sex is relatively more robust than in the other species of the genus, and the tegmina, as in *P. carnei*, are very short. In the female sex the subgenital plate has its distal margin obtuse-angulately produced mesad, the converging lateral sections of this margin subconcave and subcrenulate, while the ventral surface of the subgenital plate is very shallowly subconcave for approximately half its length, this whole area bordered laterad by low carinulae which are weakly converging distad.

Type.—♂; Snow Gum Arboretum, A.C.T.¹⁹² Circa 4700 ft. March 8, 1944 (Key and Pryor) (Division of Entomology Museum, C.S.I.R.O., Canberra).

Size relatively large for this sex of the genus; form proportionately robust (more so than in this sex of any other species of the genus); surface with impressed punctations virtually limited to areas of the pronotum and to the frontal costa.

Head with its exposed dorsal length somewhat less than the greatest breadth across the eyes (as 58 to 67), in profile the dorsal line of the head is but weakly convex; fastigium as seen from the dorsum very short and broad, its greatest length cephalad of the eyes equal to but little more than one-third of the

¹⁹¹ i.e. *unusual*, in reference to the distinctive character of the male supra-anal plate and the straight cerci of the same sex.

¹⁹² About 3 miles N. of Mt. Franklin, altitude, 4650-4700 ft. (Information from Dr. Key.)

greatest breadth of the fastigium (as 9 to 24), outline very broad and rounded obtuse-angulate, surface of disk of fastigium with its shallow impression transverse and semi-circular in outline; fastigio-facial angle as seen in profile well rounded, facial line moderately declivent; frontal costa relatively narrow at a point half-way between the ocellar axis and that of the antennal insertion, thence with the lateral borders regularly diverging ventrad to the mid-ocellar level, from which point the borders are briefly subparallel and then obsolescent, hardly reaching the supra-clypeal suture, surface of costa shallowly but continuously sulcate for virtually its entire length, with numerous impressed puncta, these biseriate in disposition dorsad. Eyes not at all prominent as seen from dorsum, projecting but little laterad of head outline, in profile with their outline rather sharp ovoid, with a well-marked juxtafastigial angle, the more cephalic section of outline evenly low convex, the caudal section very full and almost semicircular, greatest breadth of eye outline equal to two-thirds of greatest depth of same (as 30 to 45). Antennae equal to 1.25 times the length of the pronotal dorsum.

Pronotum subquadrate in general outline as seen from the dorsum, the ventro-caudal portions of the lateral lobes as seen in this view diverging but little caudad, the breadth across these subequal to the median length of the disk; cephalic margin of disk very low arcuate, caudal margin of same similarly very low arcuate, discal surface of prozona subrugulose, same surface of metazona coriaceo-punctulate; median carina well marked, lateral carinae moderately and sinuately converging cephalad, transverse sulci on dorsum three, of which the first and third (principal) bisect the median carina, prozona one and one-half times as long as the metazona, when viewed in profile the dorsal outline of the pronotum is seen to be very faintly and broadly elevated mesad and very shallowly concave on the metazona; lateral lobes with their greatest depth ventrad of the lateral carinae equal to five-sevenths the length of the latter, slightly bullate laterad in the dorsal half of the prozona, the intra-marginal, second, and third (principal) transverse sulci well marked, the second with the greatest extent ventrad, cephalic margin oblique subarcuate, the ventro-cephalic angle rounded-obtuse, ventral margin strongly obtuse-angulate, ventro-caudal angle rounded obtuse, caudal margin moderately oblique and shallowly concave.

Tegmina quite short, much shorter than the pronotum, hardly surpassing the distal margin of the proximal abdominal tergite, subquadrate in outline, their greatest breadth equal to eight-elevenths of their greatest length (as 40 to 55); costal margin broadly arcuate, rounding to the subtruncate distal margin, sutural margin moderately arcuate, disto-sutural angle subrectangulate.

Abdomen moderately compressed, somewhat more cylindrical than usual in this sex of the genus, proximal tergites appreciably tectate, this condition passing to a medio-longitudinal subcarination distad, apex of abdomen not reflexed or upcurved as usual in this sex of the genus; ultimate tergite with its distal margin broadly concave mesad, without trace of furcula; supra-anal plate subtrigonal in general outline, its greatest median length subequal to its greatest proximal

breadth, proximal crest crossing the plate at two-fifths of its length from the base, well indicated but as a whole low and without lamellate development, its median third somewhat more elevated than the lateral portions and forming a rounded transverse roll-like ridge, which passes laterad into the low plate-like extensions of the crest, which when seen from the dorsum in outline arcuately extend proximo-laterad to the lateral bases of the plate, surface of supra-anal plate distad of proximal crest with a very shallow and broad medio-longitudinal sulcation, the low lateral borders of which weakly converge distad; cerci simple, styliform, tapering, acuminate, straight as seen from the dorsum, in profile very weakly decurving in distal third, distinctly surpassing the apex of the supra-anal plate; subgenital plate very bluntly subconical in general outline as seen in dorsal or ventral aspect, in profile with its apex subrectangulate, the blunt apex as seen from the dorsum separated from the anal chamber by a short subdeplanate area.

Prosternal process relatively low, transversely lamellate and quite thin longitudinally, in transverse outline arcuate; mesosternal interspace quadrate, mesosternal lobes with both margins straight except for the rounded meso-caudal angle; metasternal lobes separated by a distance equal to half the breadth of the mesosternal interspace.

Limbs as a whole relatively short, cephalic and median femora not appreciably inflated, as in the male sex of the other forms of the genus. Caudal femora surpassing the apex of the abdomen by a distance subequal to the tegminal length, their greatest depth contained slightly more than four times in their length; caudal tibiae equal to eight-ninths the length of the caudal femora, with nine spines (including apical one) on each margin.

Allotype.—♀; same data as type (Division of Entomology Museum, C.S.I.R.O., Canberra).

Differing from the preceding description of the male in the following noteworthy aspects.

Size medium for this sex of the genus; form proportionately as robust as in the male, in general less fusiform than in females of other species of the genus with the exception of *P. carnei*; surface sculpture essentially as in the male.

Head with proportions and general outline as seen from the dorsum and also the profile of its dorsal outline essentially as in the male; fastigium as seen from the dorsum blunter and broader than in the male, proportionately somewhat less projecting cephalad than in the male, its greatest length cephalad of the eyes contained 3.5 times in the greatest fastigial breadth (as 8 to 28), fastigial outline appreciably more obtuse and much more broadly rounded than in the male, surface of disk of fastigium with its impression as in the male but somewhat broader and faintly divided medio-longitudinally; fastigio-facial angle and facial profile as in male; frontal costa broad, expanding ventrad as in the male, its surface not at all sulcate, but faintly impressed about the median ocellus, with numerous impressed puncta as in the male. Eyes not at all

prominent, even less so than in the male, in profile with the outline as in the male. Antennae but slightly longer than the pronotal dorsum (as 90 to 82).

Pronotum in general outline more nearly approaching that of the male than is usual in the genus, the metazonal caudal portions of the lateral lobes expanding but moderately, the greatest breadth across these being equal to 1.1 times the greatest median length of the pronotum (as 93 to 84); cephalic margin of disk as in male, caudal margin with the faintest possible obtuse-angulation mesad, discal surface as in male; median and lateral carinae as in male but the latter are straighter and more strongly converging cephalad, first transverse sulcus on dorsum subobsolete, the second and third as in male, prozona in length equal to seven-twelfths of the whole pronotum, when viewed in profile the dorsal line of the pronotum is nearly straight; lateral lobes with their greatest depth ventrad of the lateral carinae equal to slightly more than three-fourths the length of the latter, transverse sulci on the lateral lobes as in the male, the margins as in the latter except that the cephalic is faintly convex and the ventral one less sharply angulate.

Tegmina as in male but reaching nearly to the distal margin of the second abdominal tergite, and proportionately broader, the greatest width equal to five-sixths of their greatest length (as 52 to 63), their visible proximal breadth not quite two-thirds of their greatest breadth (as 40 to 63), in outline as in male except that the disto-sutural angle is slightly more rounded.

Abdomen in general form much as in male but slightly more compressed and less cylindrical, tectation of proximal tergites similar to but slightly less marked than that of male; supra-anal plate trigonal in outline, strongly arcuate transversely, little surface sculpture except a very weak and shallow medio-longitudinal impression distad; cerci simple, stout, tapering, failing to reach the distal margins of the infra-cercal plates; ovipositor valves of moderate bulk, apices well recurved, the ventral pair relatively short, as seen from the venter with their proximal breadth equal to eight-elevenths of their length, lateral plates acute semi-ovate in outline, the exposed length about twice the proximal depth; subgenital plate in ventral aspect with the distal margin obtuse-angulately produced mesad, the converging sections of the margin subconcave and subcrenulate, the immediate apex of the production transverse truncate, the intervalvar stylate process slender and aciculate, ventral surface of the subgenital plate shallowly concave in distal half, this area margined laterad by weakly

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂, <i>Type</i>	16.6	5.0	3.9	2.4	11.0
♂, <i>Paratype</i>	14.8	— ¹⁹³	3.5	1.6	9.6
♀, <i>Allotype</i>	18.2	4.5	4.2	3.5	11.8

¹⁹³ Lacking.

distad converging carinulae, which cut off the more lateral ascending portions of the plate.

Mesosternal interspace slightly broader than deep, very weakly widening caudad.

Caudal femora slightly less robust than in the male, their greatest depth contained 4.3 times in their length, surpassing the apex of the abdomen by a distance equal to three-fifths of the pronotal length.

Coloration.—General base tone orange-cinnamon to cinnamon, overwashed on the dorsum of the pronotum (in all) and also of the head, genae, and most of lateral lobes of the pronotum (in the type and paratype) with walnut brown, the elements of the dark pattern, bone brown to blackish brown. Dark post-ocular bars, well marked in the type and poorly indicated in the other specimens, broad, extending from the eyes across the head and prozona of the lateral lobes, and as a narrower marking on the dorsal part of the metazona of the lobes, a fine pinkish pencilling may or may not separate the post-ocular dark bar from the dorsum of the head, distinct (male) or less evident similar oblique pale lines border the post-ocular bar ventrad on the head, separating it from the striately infusate genae, which are similarly pale bordered ventrad, while in the female all the pale lines and the infuscation of the genae are but weakly or obsoletely indicated, face similar in tone to the dorsum of the head, rather obscurely fusco-punctate, supra-antennal section of antennal grooves infusate; eyes bister (type) to sayal brown; antennae of the base head colour, subinfusate distad. Lateral carinae of the dorsum of the abdomen weakly or subobsoletely pencilled with pinkish buff, lateral lobes medio-longitudinally pale in continuation of that on the head bordering the dark post-ocular bar ventrad, this on the lateral lobes, however, broad, expanding at the second sulcus and diffusing on the metazona, isolating on the prozona cephalad of the second sulcus a smaller dark area which does not reach the ventral border. Tegmina buckthorn brown to tawny, with the anal vein conspicuously paler than the general tegminal tone and flanked costad by a vein lined with fuscous and occasional (type) by a similar one in the anal field. Pleura conspicuously barred obliquely with creamy or faintly pinkish white, this contrasted with bordering area of fuscous. Abdomen with a pair of lateral bars of bone brown to blackish brown placed slightly dorsad of the middle, which fail to reach the abdominal apex, median portion of the proximal crest of the male supra-anal plate may (in the type) be finely marked with fuscous, ventral surface buffy to yellowish. Caudal femora with median carina slightly darkened, external face largely washed with cinnamon-brown, ventro-external carina pencilled with creamy white, genicular extremity with internal face bearing a transverse infuscation covering most of the proximal section of the genicular lobes, external genicular face with only the arc infusate, plus a few weak dark punctulae on the lobes; caudal tibiae pale glaucous, obscurely touched with weak fuscous proximad, the usual patellar blotch strongly contrasted fuscous, spines whitish, black tipped; caudal tarsi coloured basically as tibiae.

Paratype.—A single male paratype, bearing the same data as the type and allotype, and now in the series of the Academy of Natural Sciences of Philadelphia, has also been examined.

Distribution.—Known only from the type locality.

Remarks.—This is a most distinctive species, perhaps a relict form of limited distribution. In some respects it shows approach to *P. carnei*, of the Mt. Buffalo district of Victoria, while otherwise it is quite isolated. As the measurements given above indicate, there is some variation in size in the two males, and also there is a slight degree of difference in the exact lateral development of the proximal crest of the supra-anal plate, the paratype having the lateral continuations subobsolete, while mesad the crest is essentially the same as in the type but faintly emarginate dorsad, a condition of variation found in more than one other species of the genus. Also in the paratype male the short flattened area on the subgenital plate, between the apex and the border of the anal chamber, is slightly shorter than in the type. All of these features, however, show equal variation in degree in other species of the genus.

PRAXIEULUS CARNEI¹⁹⁴ n. sp.

Plate 13, Fig. 162; Plate 14, Figs. 163-165; Plate 23, Figs. 262-265, 271-273

This most distinctive species has no really close known relative, but in its straight male cerci, which also have other peculiarities, it shows some resemblance to the otherwise quite different *P. insolens*; on the other hand, the pronounced erect subquadrate development of the proximal crest of the male subgenital plate bears marked similarity to this structure in *P. nexilis*, also the broadly rounded subgenital plate of the same sex suggests that of the latter species, and in consequence, tentatively at least, I would place *carnei* and *nexilis* as members of the same species-group.

Type.—♂; Mt. Buffalo, Vic.¹⁹⁵ February 24, 1947 (Key and Carne) (Division of Entomology Museum, C.S.I.R.O., Canberra).

Size small (for this sex of the genus); form relatively robust, but slightly less robust in proportion than the same sex of *P. insolens*; noteworthy surface sculpture as given for *P. insolens*.

Head with its exposed dorsal length approximately four-fifths the greatest breadth across the eyes (as 47 to 55), in profile the dorsal line of the head is but weakly arcuate, although slightly more declivent cephalad than in *insolens*; fastigium as seen from the dorsum very short and broad, much as in *insolens*, its greatest length cephalad of the eyes equal to nine-twentieths of the greatest breadth of the fastigium, outline of fastigium as seen from the dorsum as in the same sex of *insolens*, surface of disk of fastigium with its impression deep, more longitudinal and more clearly defined cephalad and laterad than in

¹⁹⁴ This species is dedicated to Philip B. Carne, Research Officer, Division of Entomology, C.S.I.R.O., one of the collectors of the type material.

¹⁹⁵ "An isolated monadnock about 12 miles WSW. of Bright in the Ovens Valley." (Information from Dr. Kev.)

insolens, and caudad with an appreciable but low carinula, which is continued some distance over the occiput; fastigio-facial angle sharper than in *insolens* and very narrowly rounded obtuse-angulate, facial line moderately and sub-arcuately declivent; frontal costa broadening from its least breadth at the fastigio-facial juncture ventrad to between the antennal bases, thence ventrad continuing of uniform breadth virtually to the supra-clypeal suture, surface of costa sulcate ventrad to the median ocellus, thence the sulcation progressively diminishes in emphasis, punctulations of costa more numerous and more irregular in disposition than in *P. insolens*. Eyes slightly more prominent, as seen from the dorsum, than in *insolens*, projecting slightly more laterad of head outline, in profile with their outline more broadly ovate than in *insolens*, somewhat more rounded dorso-cephalad and ventro-cephalad, the ventro-caudal section also more broadly arcuate, greatest breadth of eye outline equal to seven-tenths of the greatest eye depth (as 27 to 37). Antennae equal to 1.3 times the length of the pronotal dorsum (as 70 to 52).

Pronotum quadrate in general outline as seen from the dorsum, the ventro-caudal portions of the lateral lobes of the pronotum hardly at all diverging laterad, these even less evident than in *P. insolens*; cephalic and caudal margins of disk subtruncate, discal surface with sculpture as in this sex of *insolens*; median carina well marked, proportionately sharper than in male of *insolens*, lateral carinae evident but not strongly marked, in pattern very faintly clepsydral, least separation at first transverse sulcus, where the distance between them is slightly more than four-fifths that at caudal margin (as 35 to 42), transverse sulci on dorsum three, very finely etched, the third alone finely bisecting the median carina, prozona subequal to twice the length of the metazona (as 35 to 18), dorsal line of pronotum as viewed in profile weakly sinuate, being faintly concave at the first transverse sulcus; lateral lobes with their greatest depth ventrad of the lateral carinae nearly equal to four-fifths the length of the latter (as 39 to 50), slightly bullate dorsad on the prozona and with their outline essentially as in *P. insolens*.

Tegmina ovate, the breadth at base equal to no more than half the greatest breadth at distal third, the latter dimension equal to five-eighths of the tegminal length, costal margin moderately arcuate, strongly rounding distad to the truncato-arcuate distal margin, which passes by the obtusely rounded disto-sutural angle to the well-arcuate sutural margin, apex of tegmina faintly surpassing the distal margin of the proximal abdominal tergite, longitudinal elements of the tegminal venation more uniformly marked in their emphasis than in *insolens*, as a whole appreciably radiating from the base to the point of greatest tegminal breadth.

Abdomen slightly more compressed than in the male of *P. insolens*, apex moderately upcurved, the seven more proximal tergites with a marked medio-longitudinal carina, this accompanied by a pronounced tectation on the five more proximal tergites; ultimate tergite without trace of furcula, its margin faintly and broadly obtuse-angulately emarginate mesad; supra-anal plate of the scutellate type characteristic of the males of most of the species of the genus,

the pronounced proximal crest elevated mesad into a slightly transverse bilobately subquadrate lamellation, which viewed in caudal aspect is shallowly emarginate meso-dorsad with the outline broadly arcuate into the sigmoid lateral sections of the same, which in turn are separated from the low lateral shoulders of the process, these shoulders as viewed from the dorsum are seen to be somewhat deflexed caudad, scutellar field of the plate with the paired median linear strumae and the lateral trigonal ones found in most species of the genus, the latter not reaching as far dorso-proximad as the median pair; cerci straight as seen from dorsum, sublamellate in general development, not reaching as far caudad as the apex of the subgenital plate, proximal depth contained faintly more than 2.5 times in the cercal length (as 8 to 21), in profile markedly tapering in distal half with the immediate apex acute, the distal extremity moderately rotated mesad; subgenital plate as seen from the dorsum with its apex bluntly subtruncate, as seen in profile hardly at all produced when contrasted with the condition found in most of the species of the genus, seen from the dorsum the dorsal margin of the plate reaches virtually to its apex.

Prosternal process transversely lamellate as in *insolens*, but in outline markedly trigonal; mesosternal interspace slightly transverse, its length equal to three-fourths of its breadth, mesosternal lobes with meso-caudal angle very broadly rounded; metasternal lobes subcontiguous.

Cephalic and median limbs relatively short, the femora, and especially the median ones, definitely inflated, as in this sex of all the other species of the genus except *P. insolens*. Caudal femora relatively stout and surpassing the upcurved apex of the abdomen by a distance equal to the dorsal length of the head, their greatest depth contained slightly more than 3.8 times in their length (as 40 to 155); caudal tibiae equal to slightly more than four-fifths the length of the caudal femora (as 127 to 155), with nine external and eight internal spines (including the apical ones).

Allotype.—♀; same data as type (Division of Entomology Museum, C.S.I.R.O., Canberra).

Differing from the preceding description of the male and that of the female of *insolens* in the following noteworthy respects.

Size average for this sex of the genus, much larger than the male of the species; form more robust, tending toward the subfusiform ensemble seen in the females of most of the species of *Praxibulus*; surface sculpture as in the female of *P. insolens*.

Head in its general proportions much resembling that of the female of *insolens*, its greatest breadth caudad equal to 1.3 times the dorsal length of the head (as 85 to 67), while the greatest breadth across the eyes is slightly less than the caudal breadth (as 81 to 85); fastigium as seen from the dorsum broad and low, its length cephalad of the eyes equal to but one-third of the greatest breadth of the fastigium, in outline much as in the female of *insolens*, impression of fastigial disk no more evident than in the same sex of *insolens*, not definitely divided mesad and cephalad the outline is more transversely arcuate than in

insolens; fastigio-facial angle somewhat more rounded than in the female of *insolens*, and much more markedly so than in the male of this species, facial line with its exact outline essentially as in the male sex but faintly less decided; frontal costa not as narrow proportionately dorsad as in the male and its lateral definition less evident ventrad, but general form basically the same, its surface deplanate except for brief and low sulcation above and below the ocellus, punctulation distribution and emphasis essentially as in the female of *insolens*. Eyes, as in the male, slightly more prominent, when seen from the dorsum, than in the same sex of *insolens*, their outline in this view slightly more convex laterad, in basal outline slightly broader than in the female of *insolens*, their greatest breadth equal to two-thirds of their depth (as 33 to 52). Antennae in length subequal to that of the pronotal dorsum.

Pronotum in general much resembling that of the female of *P. insolens*, greatest breadth caudad over metazonal portion of the lateral lobes being slightly greater than the median length of pronotal disk (as 95 to 90); cephalic margin of disk arcuato-truncate, caudal margin of same but very weakly obtuse-angulate with a shallow median emargination; pronotal carinal development in trend and emphasis as in female of *insolens*, not faintly clypsedra as in the male sex of this species, three transverse sulci evident on disk, of which the third (principal) is slightly more deeply etched than the others and is the only one which clearly intersects the median sulcus, the others doing so but faintly. prozona of disk approximately equal to 1.5 times the metazonal disk (as 52 to 36), dorsal line of pronotum in profile virtually straight; lateral lobes with their greatest depth equal to three-fourths their dorsal length (as 57 to 77), the general outline of the lobes otherwise as in the male sex, and the angles slightly more emphasized than in the female sex of *insolens*.

Tegmina broader than in the male, the greatest breadth equal to five-sixths the length (as 52 to 62), but with the general outline showing its correlation with that of the male tegmina, the visible proximal breadth being little greater than half the maximum breadth (as 28 to 52), thus distinctly narrower proximad than in the female of *insolens*, marginal shape as in the male sex.

Abdomen with medio-longitudinal rectation and carination of the tergites much less pronounced than in the male, no more marked than in the female of *insolens*; supra-anal plate as in the female of *insolens* but median shallow sulcation also weakly present proximad; cerci styliform, conically tapering, longer, and more attenuate than in the female of *insolens*, a third again as long as in the latter species; dorsal ovipositor valves appreciably stouter and thicker than in *insolens*, ventral ovipositor valves somewhat more attenuate than in *insolens*, as seen from the venter with their proximal breadth equal to seven-twelfths of their length, lateral plates broader in proportion than in the female of *insolens* with their dorsal margin more arcuate; subgenital plate with the distal margin acute produced to the intervalvar stylate process, the converging sections of the margin concave and not crenulate, ventral surface of subgenital plate not concave, instead subtumid except for a depression at the base of

the stylete process, laterad the ventral surface bears parallel carinulae briefly distad.

Prosternal process as in male; mesosternal interspace somewhat broader than deep (as 20 to 16); metasternal lobes separated by a distance not more than one-third the breadth of the mesosternal interspace.

Cephalic and median limbs much more slender than in the male (type), not at all inflated. Caudal femora in general similar to but distinctly more slender than in the male (type), their greatest depth contained 4.2 times in their length (as 59 to 253); caudal tibiae nine-tenths as long as the femora (as 230 to 253), with 9-10 external and 9 internal spines (including the apical one).

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂, Mt. Buffalo, Vic., <i>type</i>	12.7	3.5	2.74	2.11	8.1
♀, Mt. Buffalo, Vic., <i>allotype</i>	19.0	5.3	4.7	3.7	11.8
♀, Bright, Vic., <i>paratype</i>	22.6	5.7	3.5	3.7	14.3

The larger size of the Bright female, when compared with the allotypic one of the same sex, may be a response to the lower elevation of Bright, which is in the Ovens River valley immediately to the east of Mt. Buffalo.

Coloration.—General base tone clay colour to cinnamon-buff in the male and cinnamon to vinaceous-cinnamon in the female, the whole broadly overwashed on the dorsal surface of the head and pronotum with sayal brown to bister, the various elements of the dark pattern ranging from bone brown to fuscous-black. Dark post-ocular bars extending across the dorsal section of the prozona, and less solidly of the metazona, of the lateral lobes of the pronotum, this separated from the ventral section of the lateral lobes by a creamy or cream-buff bar which reaches from the eyes across all (paratype) or most (type and allotype) of the lateral lobes, this becoming washed with pale greenish caudad while it is bordered ventrad by a fuscous-black patch, which reaches only to the second sulcus (type and allotype) or may involve most of the ventral section of the lobes (paratype), the cingulate border of the lateral lobes being pencilled with the pale base colour; lateral carinae of the pronotal dorsum obscurely pencilled with orange-cinnamon in the female but unmarked in the male. Face, mouth parts, and genae pale in the type and allotype, in the latter micropunctulate with walnut brown, in the paratype the face, mouth parts, and genae are washed, streakily in areas, with bister, an oblique and incomplete dark bar extending ventro-caudad from the eyes part way across the genae, this but faintly intimated in the male (type); eyes ochraceous-tawny to buckthorn brown; antennae tawny to russet, paler proximad. Pleura with two oblique pale creamy or pale greenish bars, one on each thoracic segment, bordered with blackish fuscous. Tegmina virtually solid bister in the male, in the female snuff brown

(type) to bister, the area of the anal vein narrowly lined with cream-buff, the adjacent paralleling vein costad and suturad (less extensively) lined with fuscous. Abdominal dorsum with a medio-longitudinal subequal bar of pale base colour, sometimes micropunctulate with darker, while the usual lateral broad bars of fuscous extend distad over much of the abdomen; ventral surface greenish yellow, clearer on the abdomen, darkened on the thoracic sternites. Cephalic and median limbs quite greenish in the male, of the general base colour and relatively clear in the allotype, and irregularly punctulate with dull brown on the pale base colour in the paratypic female; caudal femora with dorsal and ventral faces of the clear base colour, external pagina rather solidly suffused with fuscous in the paratypic female, this exceedingly faint in the male (type) and obsolete in the allotype, genicular arches and all but the distal section of the internal genicular lobes markedly infusate, the external lobes much less completely and much more weakly infusate and sparsely micropunctulate; caudal tibiae very pale and rather yellowish glaucous in the male (type), more definitely glaucous in distal half and pale proximad, with extensor surface darker than the lateral ones in the females, patellar spot marked and fuscous in all individuals, tibial spines cream to white at base, tips fuscous.

Paratype.—A single female paratype, from Bright, Vic., taken March 17, 1938, by R. V. Fyfe, has also been examined. Its points of noteworthy difference from the Mt. Buffalo pair have been indicated in the preceding description.

Distribution.—Known only from Mt. Buffalo and the adjacent valley of the upper Ovens River (Bright) in northern Victoria.

Remarks.—The nearest relative of this species appears to be the here-described *P. nexilis* of the vicinity of the New England, Liverpool, and Nandewar Range in north-eastern New South Wales. They probably arose from a common ancestor, but sufficiently far in the past to permit the development of several well-marked features of divergence, such as the markedly different shape of the male cerci.

PRAXIBULUS NEXILIS¹⁹⁶ n. sp.

Plate 14, Figs. 166-168; Plate 15, Fig. 170; Plate 23, Figs. 266-270, 274-277

In its broadly rounded male subgenital plate this species resembles *P. carnei*, also in the general form of the process of the proximal crest of the male supra-anal plate, although the latter is less elevated, and further in the general form of the fastigium as seen from the dorsum. The male cerci, however, are strongly incurved, and not straight as in *carnei*, and in this the species approaches the following species, i.e. *galeritus*, which on the other hand has a more produced male subgenital plate, a more produced fastigium in both sexes as seen from the dorsum, and a more generally quadrate outline to the production of the proximal crest of the male supra-anal plate, which also has its dorsal margin

¹⁹⁶ i.e. bound together, in allusion to the general similarity of the development of the male supra-anal plate to that of *P. galeritus*, which, however, has numerous divergences in other features.

non-concave, instead of definitely so, as in *nexilis*. The nearest affinity of *nexilis* would appear to be with *carnei*, and I am so associating it in the preceding discussion of the species-groups of the genus. While the two species have well-separated ranges, they apparently have developed from the same line of the genus.

Type.—♂; 11 miles NW. of Kingstown, near Armidale, N.S.W.¹⁹⁷ December 14, 1948 (K. H. L. and B. Key) (Division of Entomology Museum, C.S.I.R.O., Canberra).

Size somewhat larger than in *carnei*; general form very similar.

Head with its general proportions as in the same sex of *carnei*, the outline of the occiput and the profile of the dorsum of the fastigium somewhat more strongly arcuate; fastigium as seen from the dorsum somewhat more produced with its outline more definitely obtuse-angulate and the apex truncate rather than broadly arcuate, its length cephalad of the eyes being almost equal to half the greatest fastigial breadth (as 10 to 21), surface of fastigial disk shaped as in *P. carnei* with an equally evident median carinula, which, however, does not reach caudad of the interocular area; fastigio-facial angle more broadly rounded than in the male of *carnei*, with its most cephalic point briefly ventrad of the ocellar level, instead of faintly dorsad of the same as in *carnei*, facial line arcuately declivent; frontal costa broadly expanding from the fastigial juncture ventrad to the median ocellus, thence for a short distance with the lateral borders subparallel, but on the lower face the sulcus becomes obsolete, surface of sulcus mesially shallowly sulcate ventrad to the median ocellus. Eyes very slightly more prominent and a little more tumid than in the male of *P. carnei* as seen from the dorsum; basal outline as in male of *carnei*. Antennae in length equal to 1.7 times that of the pronotal dorsum (as 118 to 69).

Pronotum as seen from the dorsum subquadrate, but slightly more longitudinal than in the male of *P. carnei*, the greatest breadth across the lateral lobes contained 1.1 times in the pronotal length (as 62 to 70), the ventro-caudal portions of the lobes briefly and slightly diverging, in this much as in the male of *P. insolens*; cephalic margin of the disk arcuato-truncate, caudal margin weakly bisarcuate with a very shallow and broad median emargination, disk surface proportionately narrower than in *carnei*, lateral carinulae but weakly indicated and rather irregularly subclypsedra, most approximate at the first sulcus and subsinuately diverging caudad, at the first sulcus the distance between the carinulae being but two-thirds that separating them at the caudal margin; median carina distinct but low, much less elevated than in *carnei* or *insolens*, transverse sulci as in *carnei*, the third the more definite, all three appreciably but not strongly intersecting the median carina, prozona equal to twice the length of the metazona, dorsal line of pronotum as viewed in profile nearly straight; lateral lobes more longitudinal than in *carnei*, their greatest depth ventrad of the lateral carinulae being but nine-thirteenths of their dorsal length

¹⁹⁷ Kingstown is on the upper Gwydir River (Darling drainage) in the Nandewar Range. Its elevation is between 3000 and 4000 ft, and its approximate position is 30° 31' S., 151° 7' E.

(as 45 to 65), appreciably bullate dorsad on the prozona rounding to the lateral carinulae, marginal outline of the lateral lobes essentially as in *P. carnei*.

Tegmina elliptical in outline, reaching to the basal third of the second abdominal tergite, their greatest breadth equal to seven-twelfths of their length (as 35 to 60), their breadth at the base but three-sevenths of their greatest breadth (as 15 to 35), costal margin regularly arcuate, rounding somewhat more sharply to the disto-sutural rounded apex, the distal margin obliquely truncato-arcuate, the sutural margin well arcuate, much as that of *carnei*, longitudinal elements of the venation disposed and emphasized as in *P. carnei* but less radiating in direction.

Abdomen with its general form much as in *P. carnei*, except that the tectation of the five more proximal tergites is not as marked and their surface is somewhat more rounded transversely; ultimate tergite with no trace of furcula, its margin as in *carnei*; supra-anal plate in general much as in *carnei* except that the proximal crest has its median erect lamellation virtually quadrate, with its lateral margins, as seen in caudal aspect, subparallel, narrowly rounding over the disto-lateral angles to the shallowly concave distal margin, the cephalic base of which is concavely excavate, while the lateral bases of the proximal crest lack accessory lobules, scutellar strumae of the supra-anal plate with the lateral (marginal) pair more elongate than in *carnei* and extending as far dorso-proximal as the median pair; cerci regularly incurving, the acute apices touching, the whole compressed lamellate, regularly narrowing in distal two-thirds as seen in profile, the ventral margin straighter than the dorsal one; subgenital plate in shape as in *P. carnei*, its dorsal margin reaching virtually to the apex of the plate and broadly arcuate distad as seen from dorsum, in profile as in *carnei*.

Prosternal process an erect subrectangulate lamellation, the lateral margins weakly converging distad, the apex transverse truncate, the whole markedly different from the subtrigonal form seen in *carnei* or the lower transverse lamellation of *insolens*; mesosternal interspace moderately longitudinal, narrower than deep (as 8 to 11), mesosternal lobes transverse, their depth but three-fourths their breadth, meso-caudal angle broadly rounded; metasternal lobes narrowly contiguous caudad of the foveolae.

Cephalic and median limbs short and much as in *carnei*, the femora very appreciably inflated, median femora more arcuate in profile than in *carnei*. Caudal femora with build and general form as in *carnei*, surpassing the recurved apex of the abdomen by a distance somewhat greater than the dorsal length of the pronotum, their greatest depth contained almost four times in their length (as 52 to 203); caudal tibiae in length equal to seventeen-twentieths of the femoral length (as 175 to 203), with 9 external and 9-10 internal spines.

Allotype.—♀; same data as type (Division of Entomology Museum, C.S.I.R.O., Canberra).

Differing from the preceding description of the male in the following noteworthy respects.

Size average for this sex of the genus, considerably larger than the male, but with less sexual difference in size than in *P. carnei*; form more robust and subfusiform as usual in this sex; surface sculpture essentially as in the female of *carnei* but facial punctae somewhat larger and coarser.

Head in general form much as in the female of *carnei* but slightly narrower caudad in proportion to the length of the head, the caudal breadth being approximately 1.2 times the dorsal head length (as 83 to 70), while that across the eyes is subequal to the caudal breadth of the head; fastigium in outline and proportions as in the female of *carnei*, impression of disk subobsolete, much less marked than in *carnei*, its outline not at all clearly evident; fastigio-facial angle and facial essentially as in the female of *carnei*, the former somewhat more broadly rounded than in the male of this species; frontal costa of the same general pattern as in the male but broader proportionately, the more dorsal section somewhat narrower than in the female of *carnei*, surface but faintly impressed about the median ocellus as in the female of *carnei*, surface punctations coarser and deeper than in that sex of *carnei*; seen in cephalic aspect the lateral outlines of the genae are slightly more arcuate and not as straight as in the female of *carnei*. Eyes as seen from the dorsum with their outline little protuberant laterad, even less so than in the female of *carnei*; basal outline as in female of *carnei* except that ventro-caudad the fulness of the arcuation is less regular and slightly oblique. Antennae equal in length to 1.2 times that of the pronotal dorsum (as 108 to 90).

Pronotum in general form much as in the female of *P. carnei*, but more evenly expanding caudad, the greatest breadth across the caudal section of the lateral lobes equal to 1.1 times the median length of the pronotum (as 102 to 91); cephalic margin of disk shallowly arcuate, caudal margin of same broadly and very shallowly arcuate; carinal development of disk as in *carnei* except that the lateral ones more strongly diverge caudad, the disk there being broader proportionately than in *carnei*, while the median one is somewhat lower than in *carnei* yet distinctly indicated, three transverse sulci all finely etched, but the first and third distinctly intersecting the median sulcus; proportions of prozona and metazona of pronotal disk as in the female of *carnei*; lateral lobes essentially as in the female of *carnei*.

Tegmina with their greatest breadth equal to four-fifths their length (as 55 to 72), the costal margin arcuate but somewhat flattened mesad, sutural margin more strongly and regularly arcuate; distal margin with median portion transverse truncate, the disto-sutural juncture more obtuse-angulate than the broadly rounded disto-costal one, venational base pattern as in male.

Abdomen with its features as in the female of *carnei* except in the following details; cerci slightly longer and more acutely attenuate; ovipositor valves, and particularly the dorsal ones, somewhat more slender than in *carnei*, in profile the ventral ones are more strongly decurved distad with the proximo-ventral tooth more marked; subgenital plate with the distal margin biconcave, the axes of the emarginations transverse and not oblique as in *carnei*, ventral surface of the subgenital plate broader proportionately than in *carnei*, the lateral

outlines of the plate as viewed from the venter convexly converging distad, this surface rounding dorsad into the ventral lateral sections of the plate without any surface carinations.

Prosternal process transversely lamellate, much broader than the deep lateral margins converging distad to the broadly arcuate distal margin; mesosternal interspace subquadrate, mesosternal lobes strongly transverse, nearly twice as broad as deep; metasternal lobes separated by a distance but slightly less than that between the outer borders of the foveolae.

Cephalic and median limbs similar to but very slightly shorter proportionately than in the female of *P. carnei*, the femora, as usual, not at all inflated as in the male of this species and hardly at all arcuate in profile. Caudal femora as in male except that they are slightly more slender, the greatest depth contained 4.1 times in their length (as 63 to 260).

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂, 11 miles NW. of Kingstown, N.S.W., <i>type</i>	15.8	5.9	3.4	3.0	10.4
♂, 12 miles E. of Armidale, N.S.W., <i>paratype</i>	14.9	5.2	3.5	3.4	9.7
♂, 13 miles SW. of Uralla, N.S.W., <i>paratype</i>	14.0	4.2	3.5	3.7	8.4
♂, 12 miles ESE. of Wood's Reef, near Barraba, N.S.W., <i>paratype</i>	16.3	5.3	3.5	3.5	9.7
♂, 2 miles NW. of Cobbadah, near Barraba, N.S.W.	13.6	4.4	3.0	2.25	9.1
♀, 11 miles NW. of Kingstown, N.S.W., <i>paratype</i>	17.1	5.5	4.7	3.2	13.0
♀, 11 miles NW. of Kingstown, N.S.W., <i>allotype</i>	19.8	5.8	4.8	3.5	13.5
♀, 11 miles NW. of Kingstown, N.S.W., <i>paratype</i>	22.0	6.0	4.8	3.9	13.5
♀, 12 miles E. of Armidale, N.S.W., <i>paratype</i>	17.2	5.5	4.5	3.5	12.2
♀, 6 miles SW. of Uralla, N.S.W., <i>paratype</i>	21.1	5.7	4.8	3.4	13.0
♀, 4 miles S. of Bendemeer, N.S.W., <i>paratype</i>	20.8	— ¹⁹⁸	4.5	3.2	12.7
♀, 11 miles NE. of Bendemeer, N.S.W., <i>paratype</i>	20.3	5.8	5.5	4.4	13.3
♀, 2 miles NW. of Cobbadah, N.S.W.	18.9	5.0	4.2	2.77	12.8

Coloration.—This species has two well-marked colour phases, between which there is an apparent transitional condition, which, however, appears to be due

¹⁹⁸ Not readily measurable.

to the superimposition of a different suffusion, which possibly may be genetic in character. In the male sex almost all seen represent the brown phase, except that one from 12 miles ESE. of Wood's Reef has most of the dorsal surface of the caudal femora and much of the proximal portion of their external face greenish, and that from Cobbadah has the base tone of the lateral lobes of the pronotum definitely greenish. In the female sex six individuals, representing five localities, are definitely in the green phase, while one, from 9 miles NW. of Kingstown, is otherwise of the green phase, but has the dorsum of the head and pronotum washed with vinaceous-tawny, as well as lightly so on the tegmina. Eleven other females are definitely in the brown phase, with two, from 9 and 11 miles NW. of Kingstown, washed to a varying degree on the dorsum of the head and pronotum with vinaceous-tawny to testaceous, these being those above referred to as transitional.

The two colour phases of this species have the same basic types of pattern seen in varying degrees in the other species of the genus, and in consequence in this and the following species of the genus, of which series are available, colorational pattern features cited will be largely those felt to be distinctive, supported as these discussions are by photographic illustrations.

In the brown phase the pale base tone ranges from as light as cinnamon-buff to as dark as tawny-olive (as dark as the latter only in females), while the dark over-pattern ranges from as weak as bistre to as dark as blackish fuscous. In both sexes the pale median patch on the lateral lobes of the pronotum is quite marked, generally carried forward over the genae, and sometimes it is quite greenish on the pronotum (in the type as well as several others), and the same is true of the pale pleural lines, which, like the lobar patch, are strongly contrasted with the adjacent blackish fuscous. The lateral carinae of the pronotal dorsum are usually obscurely lined in the pale tone, sometimes rather pinkish. The juxta-ocular pencillings in front of the eyes, the post-ocular bars, a short line on the prozona of the lateral lobes ventrad of the pale patch, a juxtacarinal dorsal lining of the external face of the caudal femora, and the broad subequal lateral abdominal bars, as well as the infuscation of the pleura, are marked and usually blackish fuscous, while the dorsal tone may be considerably more clear brownish as noted above. The tegmina range from concolorous with the dorsum (this in the type and in other individuals of both sexes) to similarly tinted but with the anal vein and its immediately surrounding area pencilled in dull buffy, varying in the degree of contrast, while the vicinity of the costal margin also may be somewhat paler. The lower genae generally have a darker wash ventrad of the pale line, but this may be absent, and the latter condition is more frequent in the female sex. The face is generally pale, but may be somewhat punctately infuscate, although infrequently and then more evident in the female sex. The dorsal lining of the external face of the caudal femora varies in depth of tone and also in the degree to which it suffuses the external face more ventrad, while the ventral (both) faces of the femora may or may not be washed with rose pink; the caudal tibiae are glaucous, relatively pale proximad, with a marked blackish patellar spot and with the flexor carinae lineate with blackish.

The antennae are of the pale base colour proximad becoming infusate distad; the eyes are usually snuff brown in base colour, but vary in tone and are generally blotched with fuscous.

The green phase, which is fully developed in the material before me only in females, has the same pattern elements as in the brown phase, except that the small dark area ventrad on the prozona of the lateral lobes is not evident in about half of the green phase individuals before me. In all of these, except the above-mentioned one from 9 miles NW. of Kingstown, which has the dorsum of the head and pronotum vinaceous-tawny, the pale base colour, which is solid on the dorsum of the head and pronotum and at least the dorsal surface (except genicular) of the caudal femora, is tiber green to turtle green. In this phase the abdomen is coloured essentially as in the brown one, the dark lining dorsad on the external surface of the caudal femora varying in emphasis, also the green of the dorsal surface of the same may transgress materially on to this surface, while the rose pink of the ventral faces of the caudal femora, which is relatively weak proximad, generally forms a reasonably definite pregenicular annulus. The antennae and eyes are as in the brown phase. The lateral carinae of the pronotal dorsum are lined with pinkish and the pronotal post-ocular dark ones in the green phase are always less solid and less broadly continuous on the prozona.

Paratypes.—I am here indicating two ♂ and seven ♀ with the same data as the type and allotype, plus the following, as paratypes (full data for which are given in the tabulation of specimens examined): 9 miles NW. of Kingstown, N.S.W., 3 ♀; 3 miles E. of Yarrowyck, N.S.W., 1 ♀; 12 miles ESE. of Wood's Reef, N.S.W., 2 ♂; 4 miles S. of Bendemeer, N.S.W., 1 ♀; 11 miles NE. of Bendemeer, N.S.W., 1 ♂, 2 ♀; 12 miles E. of Armidale, N.S.W., 1 ♂, 1 ♀; 3 miles W. of Armidale, N.S.W., 1 ♂; 6 miles SW. of Uralla, N.S.W., 1 ♀; 13 miles SW. of Uralla, N.S.W., 1 ♂.

Remarks.—This species in its typical form shows only the usual intra-specific variational range. However, a pair of specimens from Cobbadah, near Barraba, N.S.W., may eventually prove to be subspecifically separable. The Cobbadah male, while typical in all other features, has the proximal crest of the supra-anal plate relatively low and broad with its distal outline broadly arcuate (see Plate 23, Fig. 277). This may be found to represent a distinct subspecies of *nexilis* localized in that area. Without additional material, however, I feel that it is unwise to describe this as a new entity, although I believe that additional material will support such a conclusion.

Distribution.—This species seems to be limited to at least portions of the general uplift of the New England and the Nandewar Range in north-eastern New South Wales. The localities from which it is known in its typical condition extend from the vicinity of Ebor, on the head of the Guy Fawkes River, westward at least as far as 11 miles west of Kingstown, in the Nandewar Range, while to the southward it occurs at least as far as 4 miles south of Bendemeer. These localities are all well above the 2000-ft contour, some nearly or quite as high as 4000 ft. Cobbadah, the locality from which came the atypical material

mentioned under "Remarks", is to the north-west of the major area of occurrence, and on the northern side of the Nandewar Range, on a tributary of the upper Horton River (Gwydir-Darling drainage), and at an elevation of 1856 ft.

Specimens examined.—32; 10 ♂, 18 ♀, 2 juv. ♂, 2 juv. ♀.

New South Wales.—11 miles NW. of Kingstown, near Armidale; 14.xii.1948 (K. H. L. and B. Key) 3 ♂ (*type* and *paratypes*), 8 ♀ (*allotype* and *paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 9 miles NW. of Kingstown; 14.xii.1948 (K. H. L. and B. Key) 3 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 3 miles E. of Yarrowyck;¹⁹⁹ 14.xii.1948 (K. H. L. and B. Key) 1 ♀ (*paratype*) (Division of Entomology Museum, C.S.I.R.O., Canberra). 12 miles ESE. of Wood's Reef,²⁰⁰ near Barraba; 14.xii.1948 (K. H. L. and B. Key) 2 ♂ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 4 miles S. of Bendemeer;²⁰¹ 13.xii.1948 (K. H. L. and B. Key) 1 ♀ (*paratype*) (Division of Entomology Museum, C.S.I.R.O., Canberra). 11 miles NE. of Bendemeer;²⁰¹ 13.xii.1948 (K. H. L. and B. Key) 1 ♂, 2 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 4 miles SW. of Ebor;²⁰² 19.xi.1946 (K. H. L. Key) 2 juv. ♂, 1 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 12 miles E. of Armidale; 19.xi.1946 (K. H. L. Key) 1 ♂, 1 ♀ (*paratypes*), 1 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 3 miles W. of Armidale; 14.xii.1948 (K. H. L. and B. Key) 1 ♂ (*paratype*) (Division of Entomology Museum, C.S.I.R.O., Canberra). 6 miles SW. of Uralla;²⁰³ 13.xii.1948 (K. H. L. and B. Key) 1 ♀ (*paratype*) (Division of Entomology Museum, C.S.I.R.O., Canberra). 13 miles SW. of Uralla;²⁰³ 13.xii.1948 (K. H. L. and B. Key) 1 ♂ (*paratype*) (Division of Entomology Museum, C.S.I.R.O., Canberra). 2 miles NW. of Cobbadah;²⁰⁴ 15.xii.1948 (K. H. L. and B. Key) 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra).

PRAXIBULUS GALERITUS²⁰⁵ n. sp.

Plate 14, Fig. 169; Plate 15, Figs. 171-173; Plate 23, Figs. 278-280; Plate 24, Figs. 281-285

¹⁹⁹ Yarrowyck is 20 miles W. of Armidale.

²⁰⁰ Wood's Reef is on the southern slope of the Nandewar Range, on a tributary of the Namoi River (Darling drainage), about 7 miles due E. of Barraba. Position, 30° 24' S., 150° 44' E.

²⁰¹ Bendemeer is in the uplift area where the New England Range and the Nandewars meet. Position, 30° 54' S., 151° 10' E.

²⁰² See Vol. I, p. 226, footnote 334.

²⁰³ See Vol. I, p. 241, footnote 345.

²⁰⁴ In the Nandewar Range, on a tributary of the upper Horton River (Gwydir-Darling drainage). Elevation, 1856 ft. Position, 30° 14' S., 150° 35' E.

²⁰⁵ i.e. *wearing a cap*, in allusion to the shape of the proximal crest of the male supra-anal plate.

The type of development of the proximal crest of the male supra-anal plate of this species is quite distinct from that found in all the other species of the genus except *P. nexilis* and *duplex*, between which it is here placed. From *nexilis* the present species can at once be distinguished in the male sex by the ovoidly produced, instead of broadly rounded, subgenital plate as viewed from the dorsum and also by the more produced fastigium in both sexes as seen from the same direction. From *duplex* the male sex of the present species can at once be separated by the production of the proximal crest of the supra-anal plate having its lateral margins more subparallel, not distinctly converging distad, and by the distal margin of the same production not being distinctly emarginate mesad, as it is in *duplex*, and more rarely in *nexilis*. Also the fastigium of *galeritus* is narrower and more produced in the male sex, as seen from the dorsum, than it is in *duplex*.

The female sex of *galeritus* can be distinguished with relative ease from that of those species with which it has been compared by the slightly more produced fastigium, as seen from the dorsum, the more deeply bisemarginate distal border of the subgenital plate, and the more attenuate ovipositor valves, particularly the ventral pair as viewed from the venter.

Type.—♂; 5 miles east of Kangaroo Valley,²⁰⁶ N.S.W. December 14, 1944 (K. H. L. Key) (Division of Entomology Museum, C.S.I.R.O., Canberra).

Size average (for the genus); form slightly more attenuate than in the same sex of *nexilis*.

Head in its general form somewhat more pyramidical than in the male of *nexilis*, in profile the dorsal outline of the fastigium and occiput very weakly arcuate, appreciably flatter than in *nexilis*; fastigium as seen from the dorsum distinctly more produced cephalad than in *nexilis*, its outline rectangulate with the apex somewhat more broadly arcuato-truncate than in *nexilis*, its length cephalad of the eyes faintly greater than half the greatest fastigial breadth (as 11 to 21), surface of fastigial disk with the impression more semi-elliptical than in *nexilis* and with the median carinula equally evident in strength and extent; fastigio-facial angle appreciably sharper and more narrowly rounded than in *nexilis*, facial line in its slope as in latter; frontal costa not quite as narrow dorsad as in *nexilis* and less strongly broadened ventrad of the antennal bases, the lateral borders of the costa subparallel, clearly evident a greater distance ventrad of the median ocellus than in *nexilis*, surface of frontal costa sulcate as in *nexilis*. Eyes with their prominence as in *nexilis*, basal outline with dorsal and ventral angles slightly sharper than in *nexilis*, the fullness of the caudal section of the outline less evenly arcuate. Antennae equal to slightly more than 1.3 times the length of the pronotal dorsum (as 106 to 78).

Pronotum as seen from the dorsum with its disk somewhat more longitudinal than in *nexilis*, although the relative proportions of the whole, i.e. discal

²⁰⁶ Kangaroo Valley is in Camden County, on a small tributary of the Shoalhaven River, 8-10 miles NNW. of Nowra. Approximate position, 34° 45' S., 150° 34' E. (Information from Dr. Key.)

length compared with greatest caudal breadth across lateral lobes, are virtually the same, i.e. the latter contained nearly 1.1 times in the former (as 72 to 78), the ventro-caudal portions of the lobes being faintly more divergent, in this aspect, than in *nexilis*, cephalic margin of disk low arcuate with a faint and shallow median emargination, caudal margin very shallowly and broadly arcuate, disk surface not definitely clepsydral, its greatest breadth caudad equal to but two-thirds of its median length, lateral carinae but faintly more approximate at first transverse sulcus, weakly but appreciably diverging thence caudad; median carina marked and well elevated, intersected by the second and third (principal) transverse sulci, both of which are distinctly but not deeply impressed, lateral carinae much less elevated and less sharply defined than the median one, interrupted by all three sulci; prozona of disk nearly twice as long as the metazona of the same (as 50 to 28); surface of disk rather heavily impresso-punctate rugulose, more coarsely so on the prozona, more sharply, finely, and densely on the metazona; lateral lobes in outline and surface contour very much as in *nexilis*, but slightly more longitudinal, their greatest length at the lateral carinulae being faintly greater in proportion to their greatest depth ventrad of the lateral carinae than in *nexilis* (as 70 to 47). Mesonotum and metanotum with a strongly marked medio-longitudinal carination, which crowns lateral concavities of the surface ventrad of the carina and under the tegmina, the whole giving to the metanotum a marked tectation.

Tegmina reaching to the base of the second abdominal tergite, in outline roughly more rectangular than in *nexilis*, the greatest tegminal breadth contained nearly twice in the length from articulation (as 32 to 60) in cross section the tegmina are conchate, in outline less evidently narrowing proximad than in *nexilis*; costal margin nearly straight in its proximal two-thirds, then moderately arcuate and finally passing rather sharply into the transversely subtruncate distal margin,²⁰⁷ sutural margin very weakly arcuate distad, more definitely so proximad, disto-sutural angle narrowly rounded; venation as a whole much less regular and less sharply defined than in *nexilis*, the humeral elements not at all as firm or as entire as in that species, while on the other hand the anal vein is quite strongly indicated and divides the general tegminal surface into two sections more markedly than it does in *nexilis*.

Abdomen with its general form and distal recurvature much as in *P. nexilis*, except that the medio-longitudinal carina and its accompanying tectation are much more strongly marked than in *nexilis* continuing caudad, but to a somewhat less marked degree, the sculptural type seen on the metanotum; ultimate tergite as in *nexilis* and with no trace of furcula; supra-anal plate with its median proximal crest process very similar to that of *nexilis* in its outline, but with its lateral borders straight and faintly converging distad and narrowly rounding into the transverse truncate distal margin,²⁰⁷ concavity proximad on the cephalic face of the process as in *nexilis*, no accessory lateral lobules present at the base of the process, scutellar strumae essentially as in *nexilis*; cerci in

²⁰⁷ For discussion as to variation in these margins see "Remarks" following the description.

degree and character of curvature as in *nexilis* but of heavier form, as seen in profile with the depth less evenly narrowing distad, the depth in faintly more than the distal half uniform with that at base, thence distad more sharply narrowing to the acute apex; subgenital plate in general quite different from that of any of the preceding species, in general form being subconic in dorsal, lateral, and caudal aspects, in normal position its apex pointed dorsad, as seen from the dorsum the dorso-lateral margins are nearly straight convergent distad to the rather narrowly rounded apex, as seen in profile the dorso-lateral line is virtually straight, the ventro-caudal outline also nearly straight from the ventral base to the apex.

Prosternal process as in *P. nexilis*; mesosternal interspace deeper than broad, the breadth to depth as 8 to 13, mesosternal lobes moderately transverse, their depth but slightly more than two-thirds of their breadth (as 13 to 19), meso-caudal angle quite narrowly rounded; metasternal lobes very briefly contiguous caudad of the foveolae.

Cephalic and median limbs as in the male of *nexilis*. Caudal femora slightly shorter and less attenuate than in *nexilis*, surpassing the apex of the recurved abdomen by a distance slightly less than the length of the dorsum of the abdomen, their greatest depth contained nearly four times in their length (as 55 to 214), pattern of external pagina with its elements more spaced except proximad, more angulate and not as subarcuate as in *nexilis*; caudal tibiae in length equal to four-fifths of the femoral length (as 173 to 214), with 9-10 spines on each of the margins.

Allotype.—♀; same data as type (Division of Entomology Museum, C.S.I.R.O., Canberra).

Differing from the preceding description of the male in the following noteworthy respects.

Size of course larger than in the male, but for the sex average (for the genus); form slightly more robust than in the same sex of *nexilis*, the pronotum appreciably splaying somewhat more caudad than in *nexilis* or *carnei*.

Head with the breadth across the eyes subequal to that of the head caudad but with the eye outline as seen from the dorsum slightly more arcuate laterad than in *nexilis*; fastigium in outline slightly more produced and low angulate and less rounded than in the female sex of *nexilis*, the impression of the disk obsolete and not evident; fastigio-facial angle more appreciably angulate and less broadly rounded than in the female of either *nexilis* or *carnei*, the outline of the dorsum of the fastigium not dropping arcuately to the fastigio-facial point as it does in *nexilis*, facial line as in the female of *nexilis*; frontal costa as in the female of *nexilis* but slightly broader dorsad at the fastigial juncture, impression about median ocellus somewhat more extensive and more pronounced, impressed punctations of sides of face less evident than in *nexilis*. Eyes in basal outline as in female of *nexilis* but with dorso-cephalic angulation sharper and slightly more prolonged. Antennae subequal in length to pronotal dorsum.

Pronotum as a whole slightly larger proportionately than in the same sex of *nexilis*, the greatest breadth caudad across the lateral lobes being slightly more than the median pronotal length (as 106 to 100); cephalic and caudal margins of the disk as in the same sex of *nexilis*; median carina well marked, much more so than in the female of *nexilis*, lateral carinae somewhat more definitely developed than in the female of *nexilis*, straight, equally regular in their divergence caudad, transverse, section of dorsum somewhat more tectate than in the female of *nexilis*, surface of dorsum of metazona and cephalic fourth of that of prozona more deeply impressed vermiculato-punctate than in the same sex of *nexilis*; lateral lobes much as in the female of *nexilis* but with the principal sulcus reaching farther ventrad and the impressed punctations of the metazona, and ventrad and cephalad on the prozona more coarsely impressed. Metanotum with the medio-longitudinal carination, and also of the abdomen, much more evident than in the female of *nexilis* and nearly as strongly developed as in the male sex of this species.

Tegmina much as in the female of *nexilis* but slightly narrower proportionately, the greatest breadth equal to but three-fourths of the tegminal length (as 60 to 80), the costal margin arcuate, flatter proximad, more strongly rounding distad to the disto-costal angle, distal margin subtruncate,²⁰⁸ sutural margin moderately arcuate, much more narrowly rounding over the disto-sutural angle than in the case of the disto-costal angle; longitudinal venation less regular than in the female of *nexilis*, those of the humeral trunk and the anal vein less direct and less emphasized, while cross nervures and the accompanying areolets are fewer and coarser.

Abdomen with the medio-longitudinal carination more emphasized than in the female of *nexilis*; supra-anal plate broader and with its apex more broadly rounded than in the same sex of *nexilis*, the lateral margins more broadly arcuate in their convergence than in that species, surface with the rather broad medio-longitudinal deplanation subimpressed, reasonably well defined, narrowing distad, transverse impression of plate well marked, particularly mesad where it is straight, inclining caudad on the more lateral sections; cerci similar to but slightly stouter than those of the female of *nexilis*; ovipositor valves much as in *nexilis* but dorsal pair slightly blunter at the tips as seen from dorsum, in profile the ventral pair are slightly more attenuate with the proximal tooth more rounded and less sharply marked off than in *nexilis*; subgenital plate with its distal margin very shallowly biconcave, these ventrad of each of the ventral ovipositor valves, the median intervalvar styler process well developed, the axes of the concave emarginations almost, but not quite transverse, ventral surface of the subgenital plate broad transversely arcuate, no median impression, well rounding laterad, no lateral longitudinal carinulae or sulci.

Prosternal process transverse, sublamellate, relatively low subtrigonal in outline, the apex obtuse-angulate; mesosternal interspace slightly longitudinal, one

²⁰⁸ In paratypic females this margin ranges to sinuato-truncate.

and one-third times as deep as wide (as 20 to 15), mesosternal lobes transverse (as 30 to 20), internal margins and disto-mesal angle well arcuate; metasternal lobes separated by a distance equal to that between the foveolae.

Cephalic and median limbs slightly more robust than those of the same sex of *nexilis*, but the femora not inflated as in the male sex. Caudal femora in length subequal to seven-tenths that of the body, slightly stouter in proportion than in the male of this species, the greatest depth contained approximately three and three-quarter times in the length (as 65 to 242); caudal tibiae equal to nine-tenths of the femoral length (as 225 to 242), with 10-11 spines on the external and 9-10 on the internal margin.

MEASUREMENTS (mm)

Specimen	Length of Body ²⁰⁹	Length of Antenna	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♀, 2 miles NE. of Pambula, N.S.W. . .	15.0	— ²¹⁰	3.5	2.60	9.6
♀, McLeod's Hill, 10 miles S. of Cobargo, N.S.W.	14.0	5.2	3.5	2.28	10.2
♂, 1 mile SW. of Moruya, N.S.W. . . .	14.6	4.5	3.4	3.2	9.1
♂, 17 miles NW. of Moruya, N.S.W. . .	15.5	5.5	3.7	2.9	10.2
♂, Nelligen, N.S.W.	14.0	5.7	3.9	3.0	11.0
♂, Nelligen, N.S.W.	15.0	6.1	3.9	2.9	10.2
♂, Nowra, N.S.W.	14.5	4.5	3.9	3.0	11.0
♂, Kangaroo Valley, N.S.W., <i>paratype</i>	15.0	5.8	4.0	2.60	11.2
♂, 5 miles E. of Kangaroo Valley, N.S.W., <i>type</i>	15.5	5.7	3.9	3.0	11.2
♂, 4 miles W. of Berry, N.S.W., <i>paratype</i>	16.8	4.8	4.0	3.5	10.4
♂, 5 miles W. of Berry, N.S.W., <i>paratype</i>	17.0	5.7	4.0	3.5	11.5
♂, Newport, N.S.W.	15.0	5.5	4.0	3.4	10.5
♂, Newport, N.S.W.	17.2	6.1	4.2	3.5	11.7
♀, 1 mile SE. of Wolumla, N.S.W. . .	18.9	5.8	5.2	3.7	13.5
♀, Cobargo, N.S.W.	15.9 ²¹¹	5.2	4.5	3.4	12.8
♀, Cobargo, N.S.W.	17.4	— ²¹⁰	4.8	3.7	13.0
♀, 1 mile SW. of Moruya, N.S.W. . .	17.0	4.8	4.7	3.2	12.3
♀, Nelligen, N.S.W.	18.5	4.8	4.5	3.7	12.2
♀, Nelligen, N.S.W.	18.5	6.5	5.7	4.2	14.5
♀, Nowra, N.S.W.	18.2	5.8	5.7	4.0	14.0
♀, 5 miles E. of Kangaroo Valley, N.S.W., <i>paratype</i>	20.0	5.2	4.7	3.7	12.8
♀, 5 miles E. of Kangaroo Valley, N.S.W., <i>allotype</i>	20.5	5.3	5.3	4.2	14.1
♀, 4 miles W. of Berry, N.S.W., <i>paratype</i>	22.8	5.7	5.8	4.7	14.5
♀, 5 miles W. of Berry, N.S.W., <i>paratype</i>	23.2	6.5	6.5	4.4	15.8
♀, Newport, N.S.W.	20.5	6.1	5.7	4.0	14.1

²⁰⁹ In the male sex this measurement is in a direct line to the recurved surface of the subgenital plate.

²¹⁰ Lacking or incomplete.

²¹¹ Abdomen abnormally contracted, hence body length is less than the usual in life.

Coloration.—The two colour phases discussed under *P. nexilis* are also found in *P. galeritus*, i.e. well-marked green and brown ones. As in that species all males can be said to represent a brown phase, the only departure being that some (from Nelligen, Nowra, Kangaroo Valley, five miles W. of Berry, Dee Why, and Newport) have the paler areas of the lateral lobes of the pronotum and at least the dorsal face of the caudal femora (except distad), lumiere green. The males from Newport all have both the external surface of the caudal femora in its proximal two-thirds and the same section of the dorsal one contrastingly of that tone of green, while in the others with the dorsal face green the external one is embrowned. In the female sex all material seen can be readily sorted as of the green or brown phase, except that one brown female from McLeod's Hill has the dorsum of the head and pronotum washed with orange-vinaceous. The green phase in the female is represented by material from Nelligen (three), Nowra (one), Kangaroo Valley (one), 4 and 5 miles W. of Berry (five), and Newport (all three females), most of them from the more northern part of the distribution of the species. However, both females from Dee Why are in the brown phase. Both green and brown phase females are present in the series from Nelligen and from the Kangaroo Valley and Berry section.

The general pattern is essentially as in *nexilis* and needs no full description as the illustrations present it very well. In the brown phase the general tone of the dorsum ranges on the head and pronotum from walnut brown to vandyke brown, paling to vinaceous-tawny on the medio-dorsal surface of the abdomen and the dorsal face of the caudal femora, with the external face of the latter clouded in part (generally dorso-proximad) with weak bister to fuscous. The fuscous genal and lateral pronotal markings and the lateral abdominal bars are very well marked, also the pale pleural line, in all material, while a faint pale lining of the anal vein of the tegmen may or may not be indicated, but is usually intimated. The green phase females are very similar in colour tone, and show little difference from individuals in the same colour phase of the much more broadly distributed *P. laminatus*.

The type is in the more usual condition of the brown phase of the male, while the allotype is in the green phase of that sex.

Paratypes.—The following 16 specimens are here indicated as paratypes; Kangaroo Valley, N.S.W., 2 ♂; 5 miles E. of Kangaroo Valley, N.S.W., 1 ♂, 1 ♀; 6 miles NW. of Kangaroo Valley, N.S.W., 1 ♀; 4 miles W. of Berry (top of scarp), N.S.W., 5 ♂, 3 ♀; 5 miles W. of Berry, N.S.W., 2 ♂, 2 ♀.

Remarks.—Related on one hand to *P. nexilis* of the general area of the New England Range to the north, and on the other to *duplex* of Victoria, this species appears to be the sole member of the genus in the territory which it inhabits. The form of the lamellation of the proximal crest of the male supra-anal plate is quite distinctive, yet variable within certain limits, while that of the subgenital plate of the same sex is different from that of *nexilis*, more closely resembling that of the same structure in *P. duplex*. The median production of the proximal crest may have the lateral margins subparallel or somewhat converging distad, the apex arcuato-truncate or moderately arcuate, and rarely subemarginate

mesad, while the relative width and height of the production varies appreciably, yet the general form is sufficiently distinctive to prevent confusion with other species. The tendency of the median production to narrow distad, and to have its distal extremity more broadly rounded, is more evident in material from the extremes of the distribution than in that from the more central area about the type locality. It is seen particularly in individuals from McLeod's Hill, near Cobargo, and Moruya to the south, and Dee Why and Newport to the north. However, the Nelligen series of males, from a more central section of the distribution of the species, shows a broad variational range in the exact outline of this area.

We find some variation in the exact degree and extent of the truncation of the distal margin of the tegmina in both sexes; similarly in the male there is appreciable variation in the collective or relative emphasis of the component veins of the humeral trunk. Female individuals also vary in the degree of caudal expansion of the pronotum.

Distribution.—Apparently this species is limited to a relatively narrow area of coastal territory in south-eastern New South Wales, on the basis of present material extending from Broken Bay (Newport) and the Sydney area (Dee Why) south to at least Pambula. Its vertical range is apparently quite limited, its upper limit probably but little exceeding the 1000-ft contour.

Specimens examined.—63; 34 ♂, 28 ♀, 1 juv. ♂.

New South Wales.—2 miles NE. of Pambula;²¹² 27.ii.1945 (K. H. L. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 1 mile SE. of Wolumla;²¹³ 27.ii.1945 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). McLeod's Hill, 10 miles S. of Cobargo;²¹⁴ 27.ii.1945 (K. H. L. Key) 2 ♂, 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Cobargo;²¹⁴ 27.ii.1945 (K. H. L. Key) 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 1 mile SW. of Moruya;²¹⁵ 10.xii.1944 (K. H. L. Key) 2 ♂, 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 8 miles N. of Moruya;²¹⁵ 11.xii.1944 (K. H. L. Key) 1 juv. ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 14 miles NW. of Moruya;²¹⁵ 10.xii.1944 (K. H. L. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 17 miles NW. of Moruya;²¹⁵ 10.xii.1944 (K. H. L. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). Nelligen;²¹⁶ 27.iii.-2.iv.1948, 2-6.iv.1953 (K. H.

²¹² Pambula is in Auckland County near the coast about 15 miles due S. of Bega. Position, 39° 56' S., 149° 53' E.

²¹³ In Auckland County about 10 miles due S. of Bega. Position, 36° 50' S., 149° 50' E.

²¹⁴ Cobargo is in Dampier County on the east side of the Gourock Range, about 10 miles inland from coastal Wabaga Lake, and at an elevation of about 1000 ft. (Information from Dr. Key.)

²¹⁵ Moruya is in Dampier County, on the Moruya River a short distance above its mouth, which is about a dozen miles south of the southern point of Bateman's Bay.

²¹⁶ See Vol. I, p. 164, footnote 248.

L. Key) 8 ♂, 7 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Nowra;²¹⁷ 9.xii.1937 (K. H. L. Key) 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Kangaroo Valley;²¹⁸ 9.xii.1937 (K. H. L. Key) 2 ♂ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 5 miles E. of Kangaroo Valley; 14.xii.1944 (K. H. L. Key) 2 ♂, 2 ♀ (*type, allotype, and paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 6 miles NW. of Kangaroo Valley; 14.xii.1944 (K. H. L. Key) 1 ♀ (*paratype*) (Division of Entomology Museum, C.S.I.R.O., Canberra). 4 miles W. of Berry²¹⁹ (top of scarp); 14.xii.1944 (K. H. L. Key) 5 ♂, 3 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 5 miles W. of Berry; 14.xii.1944 (K. H. L. Key) 2 ♂, 2 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Dee Why;²²⁰ 31.i.1939 (K. H. L. Key) 2 ♂, 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Newport;²²¹ 23.xii.1952 (K. H. L. Key) 5 ♂, 3 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia).

PRAXIBULUS DUPLEX²²² n. sp.

Plate 16, Figs. 178 and 179; Plate 24, Figs. 294-297

This species is apparently a member of the *laminatus* complex of the genus, representing the extreme divergence in the character of the development of the lamellation of the proximal crest of the male supra-anal plate from the opposite extreme in this respect, which is found in *exsculptus* here described. It is possible that the future may show *duplex* to be a subspecies of *laminatus* and connected by intermediates from geographically intervening areas. However, until that is demonstrated as a certainty it is preferable to regard *duplex* as a distinct species occurring in localized areas in Victoria. From *laminatus* the higher, narrower, and distally bilobate production of the proximal crest of the male supra-anal plate will readily distinguish *duplex*, also the less subtuberculate apex of the subgenital plate of the same sex. The female sex of *duplex* is as yet unknown.

²¹⁷ On lower Shoalhaven River, about 10 miles from the sea.

²¹⁸ Kangaroo Valley is in Camden County on a small tributary of the Shoalhaven River, 8-10 miles NNW. of Nowra.

²¹⁹ Berty is in Camden County about 5 miles N. of Shoalhaven River, 8 miles in an air-line NE. of Nowra.

²²⁰ "Seaside resort, now virtually a suburb of Sydney, located about 10 miles air-line NNE. of the centre of the city." (Information from Dr. Key, 1953.)

²²¹ On coast S. of Broken Bay and N. of Narrabeen. Position, 33° 40' S., 151° 20' E.

²²² In allusion to the divided apex of the lamellate production of the proximal crest of the male supra-anal plate.

Type.—♂; 1 mile south of Gormandale,²²³ Vic. March 2, 1915 (K. H. L. Key) (Division of Entomology Museum, C.S.I.R.O., Canberra).

Size quite small (for the genus); form relatively slender; surface relatively smooth except for the dorsum of the pronotum and the metanotum and less definitely most of the prozona of the lateral lobes, which are subshagreenously impresso-rugulose.

Head in general much resembling that of the same sex of *P. l. laminatus* with the eyes hardly more prominent as seen from the dorsum; fastigium very similar in dorsal aspect, its greatest breadth slightly less than half its length cephalad of the eyes (as 9 to 20), its outline as a whole rather more broadly rounded, fastigial disk rather shallowly but distinctly excavate, its outline more angulate cephalad than in *l. laminatus*, median carinula obsolete, and hardly, if at all, more evident on the occiput, interspace between the eyes equal to seven-tenths the greatest fastigial breadth (as 14 to 20); fastigio-facial angle as seen in profile slightly sharper than in *l. laminatus*, the actual juncture more narrowly rounded; facial outline slightly more straight oblique ventro-caudad than in *l. laminatus*; frontal costa as a whole broad, less appreciably narrowed dorsad than in *l. laminatus*, its margins similar but its surface more extensively, and more deeply, excavate, this extending a fair distance dorsad of the antennal insertion and to somewhat ventrad of the median ocellus. Eyes as seen in profile with basal outline ovoid, subacute dorso-cephalad, greatest breadth of outline equal to three-fourths of its greatest length (as 29 to 39). Antennae nearly twice as long as the exposed dorsal length of the head (as 90 to 47), composed of 20 articles, these longest mesad, apex blunt.

Pronotum slightly shorter proportionately than in *l. laminatus*, with its dorsum equal to slightly less than 1.4 times the exposed dorsal surface of the head (as 65 to 47), greatest caudal width of the pronotal dorsum equal to nearly three-fourths the length of the same (as 48 to 65), greatest breadth caudad across lateral lobes but slightly less than the pronotal length (as 60 to 65), the disk moderately clepsydral, moderately narrowed at the first transverse sulcus, thence regularly widening both cephalad and caudad; cephalic margin of disk low arcuate, caudal margin of same subtruncate, least width of disk (at first transverse sulcus) slightly more than half the greatest (caudal) breadth of the same (as 28 to 48); median carina well marked but finer than in *l. laminatus*, polished, intersected by all three transverse sulci; surface of disk sculptured as in *l. laminatus*, prozona occupying eight-thirteenths of the total length of the disk (as 40 to 65); lateral lobes with their depth equal to approximately seven-ninths of their dorsal length (at lateral carinae of the disk) (as 42 to 58), transverse sulci as in *l. laminatus* but slightly less deeply cut, margins essentially as in *l. laminatus* but ventral one with its median angulation sharper, as is also true of the ventro-caudal angle, while the caudal margin has its ventral half more

²²³ Gormandale is situated "10 miles SE. of Traralgon, in south Gippsland". (Information from Dr. Key, 1953.)

straight oblique; surface of lateral lobes with its impresso-punctate areas more finely cribose than in *I. laminatus*.

Tegmina but slightly shorter than the dorsum of the pronotum (as 60 to 65), their apices reaching to the middle of the second abdominal tergite, greatest breadth of tegmen as viewed in dorso-lateral aspect subequal to half of the tegminal length (as 30 to 59); in general outline and venational emphasis essentially as in *I. laminatus*.

Abdomen with its apex very appreciably upcurved, its medio-longitudinal dorsal carina as emphasized as in *I. laminatus*, also the tectation of the more proximal tergites; ultimate tergite without furcula; supra-anal plate with its more distal portion having the median pair of strumose ridges carried more proximad than usual in the genus and they are more approximate and less divergent in that direction, proximal crest strongly elevated mesad into an erect subquadrate lamellation, which in height is subequal to its breadth at base between the lateral angular nodes of the crest, the lateral margins of the lamellation very weakly converging distad and its apex is V-emarginate mesad, giving this area a marked binodose appearance; cerci moderately compressed, not as deep as in *I. laminatus*, their dorsal and ventral borders evenly converging to the attenuately spiculate apex, which is weakly and briefly decurving, their apices reaching virtually to that of the subgenital plate; subgenital plate moderately conical in its general form, slightly sharper at the apical extremity than in *I. laminatus*, the actual apex narrower than in *I. laminatus* and very briefly caudad of the margin of the anal orifice, as seen in profile the ventro-caudal outline of the subgenital plate is weakly arcuate.

Prosternal process in transverse outline subtriangular, transversely compressed and sublamellate in consequence, the apex narrowly rounded acute, the whole more acute than in *I. laminatus*. Mesosternal interspace relatively narrow, longitudinal, twice as deep as least width, mesosternal lobes subquadrate, meso-caudal angle rather narrowly rounded; metasternal lobes very narrowly separated caudad of the foveolae.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Width of Pronotum Across Lateral Lobes	Length of Tegmen	Length of Caudal Femora
♂, 1 mile S. of Gormandale, Vic., <i>type</i>	13.8	4.5	3.2	3.0	3.0	9.7
♂, 1 mile S. of Gormandale, Vic., <i>paratype</i>	14.0	3.9	3.2	2.9	2.4	9.2
♂, Mt. Buffalo, Vic., <i>paratype</i>	13.5	4.0	3.2	2.9	2.4	9.2
♂, Mt. Buffalo, Vic., <i>paratype</i>	14.3	4.5	3.7	3.2	3.0	10.5

Cephalic and median limbs much as in *I. laminatus*. Caudal femora with their apices surpassing the apex of the abdomen by a distance subequal to the length of the pronotal dorsum, in form slightly more slender than in *I. laminatus*, the greatest depth (at proximal fifth) contained four times in their length (as 15 to 60), carinae, paginal pattern, and form of genicular lobes as in *I. laminatus*; caudal tibiae slightly shorter than femora, external and internal margins each with nine spines.

Female sex not known.

Coloration.—The colour pattern of this species is the same as that which is found basic in the member of this genus, and does not need to be reanalysed here. The two individuals from the Gormandale area, as seen from the dorsum, are very dark, and largely bone brown in that aspect, with the cephalic and median limbs and the caudal femora with their base colour mikado brown to pale rufous, the latter with their distal extremities somewhat infumate dorsad, the genicular arches and the more proximal portion of the genicular lobes heavily infuscate, while the external paginae of these femora are rather solidly washed with cinnamon-brown to prout's brown, the ventral faces citron yellow to chamois. The lateral lobes of the pronotum of the Gormandale individuals have a pale median area on the prozona and a weaker one on the metazona, which are vinaceous-buff in the darker individual (*paratype*) and buffy washed with chalcedony yellow connected into a sublongitudinal bar in the type, while in both from that locality the cingulate caudal and ventral margins of the lobes are similarly contrasted in the same colours. The two Mt. Buffalo paratypes are appreciably paler dorsad with the usual fuscous post-ocular bars well marked, either solid or slightly broken by paler areas, these moderately well contrasted with the snuff brown occiput and pronotal dorsum; lateral lobes of the pronotum in the Mt. Buffalo paratypes have the pale areas much more extensive, involving most of the ventral half of the prozona and much of the same portion of the metazona, and largely chalcedony yellow to clear dull green-yellow (of Ridgway). The limbs in the Mt. Buffalo individuals are much as in the Gormandale ones except that the external paginae are less solid and paler ventrad.

In the material before me the face ranges from flesh colour to carob brown (the latter in the dark paratype from near Gormandale), in the latter the genae being almost solidly concolorous. The ventral surface of the body is buffy to flesh coloured, occasionally infumate on the sternum, this tone extending dorsad over the lateral surfaces and the apex of the abdomen, the dark dorsum of the latter with an evenly wide median area on the more proximal articles which are more grey brown, and in this area each of these articles has a pair of more glabrous silvery spots. Antennae of the general tone; eyes greenish grey to bister, sometimes mottled. Tegmina with the paler tone of the area of the anal vein but little if at all contrasted. Cerci of the general pale tone of the abdominal apex; supra-anal plate with most of the median lamellation of the proximal crest, the lateral nodules of the same, and the bullations of the main disk of the supra-anal plate, dark fuscous. Caudal tibiae pale glaucous green

or dull plumbeous glaucous, palest next to the fuscous patellar patch, spines creamy white with dark tips.

Paratypes.—The three specimens of this species other than the type, all males, are regarded as paratypes. One bears the same data on the type, the others are from Mt. Buffalo, Vic., taken February 24, 1947, by Key and Carne. One of the Mt. Buffalo specimens is somewhat larger than the other specimens, as shown in the preceding measurements.

Distribution.—Known from two isolated areas in Victoria, one Mt. Buffalo, in the Victorian highlands, 12 miles WSW. of the town of Bright, the other near Gormandale in a relatively elevated section of south Gippsland. This distribution would seem to indicate an earlier broader distribution, with scattered relict populations now surviving.

Specimens examined.—4 ♂.

Victoria.—Mt. Buffalo; 24.ii.1947 (Key and Carne) 2 ♂ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 1 mile S. of Gormandale; 2.iii.1945 (K. H. L. Key) 2 ♂ (*type* and *paratype*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia).

PRAXIBULUS LAMINATUS (Stål)

This species is the dominant and most widely spread member of the genus. In certain respects it is also the most variable, and a clear understanding of the character and value of these variations has been difficult to secure. Fortunately there has been available many times the amount of material examined previously, totalling some hundreds of individuals, and the conclusions here expressed have been reached only after a very careful and exhaustive analysis of these series, in some cases of extensive representations from single localities.

There are three well-marked geographic subspecies of *laminatus*, which, as with other species of the genus, are recognizable chiefly on the basis of the character of the median lobation of the proximal crest of the male supra-anal plate, and the intergradation of these three subspecies is either definitely shown or suggested by individuals from areas which are intermediate in position between those where fully typical individuals of the respective components occur.

It is now clearly evident that the characters on which two of the three previously known "species" of the genus, i.e. *latipennis* Stål and *uluaris* Sjöstedt, were erected are valueless in such connexions. The former was based on the green phase of the female of *l. laminatus*, while for *uluaris*, also based on the female sex, no feature of diagnostic worth was originally given, those cited now being evident as individual variables in any extensive series. Also, unfortunately, the female sex, on which both were based, exhibits much less in the way of constant diagnostic characters than the male. However, Sjöstedt's *ulnaris* was based on Melbourne material, and male Victorian individuals of *laminatus* show a sufficiently distinctive form of the proximal crest of the supra-

anal plate to warrant the retention of *ulnaris* in a subspecific sense. Stål's *latipennis*, on the other hand, I find cannot possibly be retained as distinct from *laminatus*, even with Sjöstedt's determined Lake George material before me, which latter probably was compared with Stål's type.

The third subspecies of *laminatus* here discussed is geographically rather isolated in the general region of the Liverpool Range, and evidence of its intergradation southward into *l. laminatus* is seen in material from intermediate stations.

The reference of female individuals to the various subspecies of *laminatus* is made with less certainty than is true of males, as in the former there are few features which are not individually variable or which are sufficiently evident to be of systematically distinctive value.

The distribution of *laminatus* as a species extends over much of east-central and south-eastern New South Wales and central and eastern Victoria. It ranges as far north in the interior as the Liverpool Range and the area immediately to the north of that uplift (*l. actus*), yet does not appear to reach the eastern coastal section, which is occupied by *P. galeritus*, but is, however, broadly distributed over the more elevated portions of most of south-eastern New South Wales, up to a considerable elevation on the Kosciusko massif (4400 ft) and as high as 4700 ft in the Australian Capital Territory (Snow Gum Arboretum). From this high ground it ranges downward over the western slopes of the elevated areas as far as the upper Lachlan (Cowra district), the central Murrumbidgee (Wagga), and the upper Murray (Jingellic area), at the latter having passed into the Victorian subspecies *l. ulnaris*, which latter reaches eastward in Victoria to Genoa, which is at the extreme eastern point of the State, and thence westward to the Melbourne district, but does not seem to occur at as high elevations in Victoria as in New South Wales.

The chief differential features of the three subspecies of *laminatus* have been given in the key to the forms of the genus.

The nearest relatives of *laminatus* are clearly *P. duplex*, here described, of certain areas in Victoria, and *P. exsculptus*, similarly new, from the Nandewar Range, the New England Plateau, and the Barrington Tops of north-eastern New South Wales.

PRAXIBULUS LAMINATUS ULNARIS Sjöstedt

Plate 16, Figs. 180-183; Plate 24, Figs. 298-304

Praxibulus ulnaris Sjöstedt, 1921, Kungl. Svenska Vetenskapsakad. Handl. 62 (3): 101, 102, Text-Fig. 17 (♀; Melbourne, "S. Australia" [error for Victoria]); Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 76, 77 (no additional information).

Typical *l. ulnaris*

Victoria.—Alexandra;²²⁴ Feb. 1950 ("J.H.S.") 1 ♀ (Division of Entomology

²²⁴ In valley of Goulburn River, ESE. of Seymour. Approximate position, 37° 12' S., 145° 42' E.

Museum, C.S.I.R.O., Canberra). Mt. Waverley;²²⁵ 1944 (Dept. of Agriculture) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Gibraltar Point, Wonnangatta River;²²⁶ 12.xii.1949 (T. G. Campbell) 2 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 2 miles W. of Lakes Entrance;²²⁷ 1.iii.1945 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 2 miles E. of Nowa Nowa;²²⁸ 1.iii.1945 (K. H. L. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 1 mile SW. of Genoa;²²⁹ 28.ii.1945 (K. H. L. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra).

New South Wales.—7 miles NE. of Jingellic;²³⁰ 20.ii.1947 (K. H. L. Key) 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra).

Intermediate between *P. l. ulnaris* and *P. l. laminatus*

New South Wales.—7 miles W. of Wagga;²³¹ 13.xii.1945 (K. H. L. Key) 2 ♂ (Division of Entomology, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 2 miles W. of Wagga;²³¹ 11.i.1945 (L. R. Clark) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra).

This subspecies was based on several females, i.e. "♀ ♀, type. Mus. Paris et Stockholm", collected by von Müller. It is evident from correlated evidence that this material went to Sjöstedt from the Paris Museum, and the fact that the name of that institution stands first in the above quotation also warrants the indication of the Paris Museum as the possessor of the single type of *ulnaris*.

The chief distinguishing character of *P. l. ulnaris*, as contrasted with *P. l. laminatus*, is the proportionately high and more linguiform median production of the proximal crest of the male supra-anal plate. This narrows evenly distad to the well-rounded and entire apex, but varies individually in its relative breadth, yet is always much more elevated than the usual broadly rounded lobation of this area in *l. laminatus*. The female sex shows almost no clear differential feature from typical *laminatus*, but the fastigium is faintly less produced cephalad when seen from the dorsum, and in profile the fastigio-facial angle is slightly more rounded.

Male.—The differential features of the male are all genitalic, the following points having been drawn from the male from 1 mile SW. of Genoa, Vic.

²²⁵ "10 miles ESE. of Melbourne." (Information from Dr. Key, March 1943.)

²²⁶ "About 7 miles slightly south of west of Dargo." (Information from Dr. Key, March 1953.)

²²⁷ An inlet on coast about 15 miles SW. of Nowa Nowa, and nearly 30 miles nearly due W. of the mouth of the Snowy River.

²²⁸ Near coast of Gippsland, on railway between Bairnsdale and Orbost. Approximate position, 37° 44' S., 148° 7' E.

²²⁹ In extreme eastern Victoria, on Genoa River near its debouchement into Lake Purgagoolah. Approximate position, 37° 31' S., 149° 36' E.

²³⁰ "On the Murray River, 24 miles approximately SE. of Holbrook." (Information from Dr. Key, March 1953.)

²³¹ This refers to the well-known locality Wagga Wagga, on the middle course of the Murrumbidgee River.

Supra-anal plate with the proximal ridge developed mesad into an erect linguiform process, which in height, as seen in cephalic aspect and from the base of the plate, is equal to two-thirds of the proximal breadth of the plate,²³² its lateral margins evenly converging from the usual proximo-lateral shoulders of the ridge to the well-rounded apex, as seen in profile the process is erect and not inclined (see Plate 24, Fig. 302); cerci much as in *l. laminatus* but slightly less attenuate distad as seen in caudal aspect, and with their apices faintly more decurving, while as viewed from the dorsum they are slightly more sigmoid in outline; subgenital plate with apex more acuminate produced than in the male of *l. laminatus*, this subtuberculately distinct from and caudad of the dorsal margin of the anal orifice, and as seen in profile subrostrate and somewhat more produced than in *l. laminatus*.

Female.—The following notes have been drawn from the above-listed female from Alexandra, Vic.²³³ They present only those features which appear to show an appreciable difference from those of the very plastic *P. l. laminatus*, and with which they are compared. Fastigium as seen from the dorsum broader, less produced and more rounded in outline, the angle broad obtuse, the fastigial length cephalad of the eyes contained 3.6 times in the greatest proximal breadth of the fastigium (as 9 to 33),²³⁴ the interocular space, as the fastigium, broader than in *l. laminatus*; fastigio-facial angle more broadly rounded as seen in profile.²³⁵ Ovipositor valves slightly shorter and thicker (proximad) than in *l. laminatus*; subgenital plate as in *l. laminatus*, with disto-lateral folds or carinae moderately evident.

While the material of this subspecies is too limited to do more than suggest possible geographic size correlations, it is evident that the Gibraltar Point material of both sexes is larger than any other seen, and also that Gippsland coastal individuals and those from the Murray River (Jingellic) are smaller than any other typical material.

Coloration.—This subspecies like other representatives of the genus exhibits both the brown and green phases, and in general these are very similar to what we find in *l. laminatus*. In the male sex all individuals before me are in the brown phase except one of those from Gibraltar Point, which in certain respects approaches the green phase by having the paler areas of the pronotal lateral lobes, the ventral and dorsal surfaces of the caudal femora, and the base tone of the cephalic and median limbs, which, however, are in part overwashed with fuscous, as well as the lateral surfaces of the abdomen and that of the entire venter chalcedony yellow to ecru-olive. The general pattern of coloration in both sexes is essentially as in *l. laminatus*, and in fact that of most other members of the genus. The base tone of the brown phase ranges from as pale

²³² In the males from other localities, in which this process is less strongly elevated, the height is approximately one-half of the proximal breadth of the plate.

²³³ While the Mt. Waverley female specimen actually came from nearer the type locality (Melbourne) than that from Alexandra, the former is somewhat damaged.

²³⁴ In average females of *l. laminatus* this ratio is nearer 3.3 (or as 9 to 30).

²³⁵ The material intermediate between *l. laminatus* and *l. ulnaris* from the Wagga area, New South Wales, has the fastigio-facial profile as in *l. laminatus*.

MEASUREMENTS (mm)						
Specimen	Length of Body	Length of Antenna	Length of Pronotum	Width of Pronotum Across Lateral Lobes	Length of Tegmen	Length of Caudal Femur
Typical <i>P. l. ulnaris</i>						
♂, Gibraltar Point, Won- nangatta River, Vic. . .	16.8	5.5	4.0	3.7	3.5	11.2
♂, Gibraltar Point, Won- nangatta River, Vic. . .	16.2	5.5	4.2	3.7	3.9	11.0
♂, 2 miles E. of Nowa Nowa, Vic.	12.8	4.8	3.4	3.0	3.0	9.7
♂, 1 mile SW. of Genoa, Vic.	13.0	5.3	3.5	3.2	2.9	10.4
♂, 7 miles NE. of Jingellic, N.S.W.	14.0	4.5	3.5	3.0	3.0	9.9
♀, Alexandra, Vic.	19.3	5.0	5.2	5.5	3.5	14.9
♀, Melbourne, Vic., <i>type</i> , ex Sjöstedt	18.0	—	4.8	—	3.0	12.0
♀, Mt. Waverley, Vic.	16.0	4.2	— ²³⁶	4.4	3.0	11.8
♀, Gibraltar Point, Won- nangatta River, Vic.	20.5	5.8	6.1	6.3	4.2	14.8
♀, 2 miles W. of Lakes En- trance, Vic.	16.0	3.7	4.5	4.4	3.2	11.4
♀, 7 miles NE. of Jingellic, N.S.W.	16.0	4.4	4.0	4.5	3.4	12.0
Intermediate between <i>P. l. ulnaris</i> and <i>P. l. laminatus</i>						
♂, 7 miles W. of Wagga, N.S.W.	14.0	4.8	3.5	3.2	3.4	9.7
♂, 7 miles W. of Wagga, N.S.W.	14.0	4.5	3.5	3.4	3.2	9.6
♀, 2 miles W. of Wagga, N.S.W.	15.5	4.8	4.0	4.0	3.4	11.7

as tawny-olive in the Jingellic female, through sayal brown, in the Lakes Entrance female, and snuff brown and Saccardo's umber, in the males from near Nowa Nowa and Genoa, to as dark as bister, in the second Gibraltar Point male. The females from Alexandra and Mt. Waverley are in the marked green phase, while those from Gibraltar Point and Lakes Entrance, Vic., and 7 miles NE. of Jingellic, N.S.W., exhibit tones of the brown phase, that from the first-mentioned locality having these ranging from sayal brown to verona brown, and like the males from that place being deeper in tone than the other of the same sex.

The generally dark tone of the Gibraltar Point individuals possibly may be correlated with areas of higher precipitation, the paler tone of Jingellic specimens with those of lower rainfall.

²³⁶ Margin damaged.

The emphasis placed by Sjöstedt on the pale and contrasted tone of the ulnar vein of the tegmina in the original females of this form was probably due to the paucity of the material of the genus available to him, as a similar contrast is found in many individuals of *l. laminatus* now before me, and is as variable in strength in *l. ulnaris* as in *l. laminatus*, or in fact in other species of the genus.

Remarks.—The extreme condition of this subspecies, as evidenced by the character of the median production of the proximal crest of the male supra-anal plate is represented by the individual from near Genoa, Vic., which served as the basis for the preceding description of that structure. All male individuals here referred to typical *l. ulnaris* possess to a definite degree its distinctive type of development of the proximal crest of the supra-anal plate. The two males from the vicinity of Wagga, N.S.W., which are regarded as evidencing the intergradation of this subspecies into typical *laminatus*, show a marked difference in the development of the proximal crest, in one this being typical of *l. ulnaris*, while in the other it is very low, in fact definitely lower than in the average of *l. laminatus*. In consequence I regard that representation as a whole as unstable and collectively sharing the features of the two subspecies. I have no doubt that a larger series would show concretely the blending of the two subspecies in that area.

Distribution.—Apparently this subspecies occurs in the lower country and in some of medium elevations over much of eastern and central Victoria, extending northward to the middle course of the Murray River in extreme southern New South Wales, then intergrading northward, probably along the eastern border of Riverina, into typical *l. laminatus* of higher levels eastward in New South Wales. We do not know whether *Praxibulus* occurs in western Victoria. The extreme eastern point from which typical *l. ulnaris* is known is Genoa, the most western Melbourne, the most northern the Jingellic area of New South Wales, along the upper course of the Murray River, while it reaches the south coast of Victoria at Lakes Entrance. It is not possible to state the highest point at which it has been taken, as I do not have elevational data for several localities, but it apparently does not reach the higher levels, where it seems to be replaced by the related *P. duplex* and the quite different *P. carnei*.

PRAXIBULUS LAMINATUS LAMINATUS (Stål)

Plate 17, Figs. 184-187; Plate 24, Figs. 305-312

P[raxilla] laminata Stål, 1878, Bihang K. Svenska Vetenskapsakad. Handl. 5 (4): 95 (♂; New South Wales).

P[raxilla] latipennis Stål, 1878, Bihang K. Svenska Vetenskapsakad. Handl. 5 (4): 96 (♀; "Lord Howe Island"²³⁷).

²³⁷ While there is no conclusive evidence either way, there is no question in my mind but that Stål's type specimens of *latipennis* were erroneously labelled for locality. While some Australian species do occur on Lord Howe Island, we have no new evidence of the occurrence of this species on that isolated island over 350 miles to the eastward of any point of Australia. Sjöstedt in 1921 (Bihang K. Svenska Vetenskapsakad. Handl. 62 (3): 102) seems to have had misgivings as to the correctness of the locality originally stated, as he notes for *latipennis*, "Lord Howe Isl. (Solomon Isl. vel in Tasman Sea?)". There is no other report of this subspecies from outside the portion of New South Wales from which it is here recorded.

P[raxibulus] laminata Kirby, 1910, Syn. Cat. Orth. 3: 397 (First use of combination); [*laminatus*] Sjöstedt, 1921, Bihang K. Svenska Vetenskapsakad. Handl. 62 (3): 101, 102 (New South Wales); Sjöstedt, 1935, Bihang K. Svenska Vetenskapsakad. Handl. (3) 15 (2): 76 (Description of ♀; Snowy River, N.S.W.; Blundell's "Rgs.", F.C.T. [= A.C.T.]).

P[raxibulus] latipennis Kirby, 1910, Syn. Cat. Orth. 3: 397 (First use of combination), Sjöstedt, 1921, Bihang K. Svenska Vetenskapsakad. Handl. 62 (3): 101, 192 ("Lord Howes Isl."); Sjöstedt, 1935, Bihang K. Svenska Vetenskapsakad. Handl. (3) 15 (2): 76, 77 ("Lord Howes Isl."; Lake George, N.S.W.).

New South Wales.—6 miles W. of Wallerawang;²³⁸ 2.xii.1948 (K. H. L. and B. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 11 miles WSW. of Bathurst; 1.xii.1948 (K. H. L. and B. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Trunkkey (also called Arthur);²³⁹ 16.ii.1937 (K. H. L. Key) 3 ♂, 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 15 miles NE. of Cowra; 1.xii.1948 (K. H. L. and B. Key) 1 ♂, 3 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 7 miles SW. of Crookwell;²⁴⁰ 30.xi.1948 (K. H. L. and B. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Forster;²⁴¹ 4.xii.1947 (K. H. L. and B. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Forster to Cape Hawke; 15.xii.1947 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 1 mile W. of Mittagong; 21.xii.1944 (K. H. L. Key) 3 ♂, 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Bowral;²⁴² Feb. 1946 (R. McHelland) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 1 mile W. of Bowral; 15.xii.1944 (K. H. L. Key) 1 ♂, 3 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 1 mile NW. of Moss Vale; 15.xii.1944 (K. H. L. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 2 miles SW. of Bundanoon;²⁴³ 21.xii.1944 (K. H. L. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 4 miles W. of Wingello;²⁴⁴ 21.xii.1944 (K. H. L. Key) 2 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Exeter;²⁴⁵ 21.xii.1944 (K. H. L. Key) 2 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Sassafras, SW. of Nowra; 13.xii.1944 (K. H. L. Key) 2 ♂ (Division of Entomology Museum, C.S.I.R.O.,

²³⁸ Wallerawang is about 10 miles NW. of Lithgow and 25 miles NW. of Katoomba. Elevation nearly or quite 4000 ft. (Information from Dr. Key, 1948.)

²³⁹ "Also known as 'Arthur', situated 20 miles SSE. of Blayney." (Information from Dr. Key, 1953.)

²⁴⁰ At head of Crookwell Creek, upper Lachlan River (Murray system). Approximate position of Crookwell, 34° 27' S., 149° 30' E. Elevation, close to 4000 ft.

²⁴¹ See Vol. I, p. 93, footnote 142.

²⁴² About six miles NE. of Moss Vale, Camden County.

²⁴³ In Camden County, about 8 miles SSW. of Moss Vale. Elevation, 2200 ft. (Information from Dr. Key, 1951.)

²⁴⁴ In Camden County, about 80 miles air-line SW. of Sydney. Approximate position, 34° 42' S., 150° 9' E.

²⁴⁵ In Camden County, on railway between Moss Vale and Goulburn, about 5 miles SW. of latter.

Canberra, and Academy of Natural Sciences of Philadelphia). 3 miles NE. of Nerriga;²⁴⁶ 13.xii.1944 (K. H. L. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 7 miles S. of Nerriga; 13.xii.1944 (K. H. L. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 22 miles NE. of Braidwood; 13.xii.1944 (K. H. L. Key) 1 ♂, 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 17 miles NE. of Braidwood; 13.xii.1944 (K. H. L. Key) 2 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 13 miles NE. of Braidwood; 13.xii.1944 (K. H. L. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 8 miles NE. of Braidwood; 13.xii.1944 (K. H. L. Key) 2 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 1 mile N. of Braidwood; 13.xii.1944 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 9 miles S. of Braidwood; 27.ii.1945 (K. H. L. Key) 4 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Monga, 14 miles SE. of Braidwood; 12.xii.1944 (K. H. L. Key) 5 ♂, 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 6 miles N. of Captain's Flat;²⁴⁷ 9.xii.1944 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 5 miles N. of Captain's Flat; 9.xii.1944 (K. H. L. Key) 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 3 miles SW. of Captain's Flat; 9.xii.1944 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 4 miles SW. of Captain's Flat; 9.xii.1944 (K. H. L. Key) 11 ♂, 14 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 11 miles E. of Queanbeyan;²⁴⁸ 9.xii.1944 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 8 miles E. of Queanbeyan; 9.xii.1944 (K. H. L. Key) 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 2 miles E. of Queanbeyan; 9.xii.1944 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Lake George; 16.i.1935 (W. J. Rafferty) 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia);²⁴⁹ 24.i.1936 (A. L. Tonnoir) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Alpine Creek;²⁵⁰ 12-13.xi.1938 (A. L. Tonnoir) 5 ♂, 5 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). About 5 miles NNE. of Mt. Coree; 18.ii.1950 (K. H. L. Key) 1 ♂

²⁴⁶ On tributary of Shoalhaven River, at foot of Pidgeon House Range. Approximate position 35° 6' S., 150° 8' E.

²⁴⁷ On upper tributary of Murrumbidgee River, just E. of the Australian Capital Territory, in Murray County. Elevation, 3000 ft +. Approximate position, 35° 35' S., 149° 25' E.

²⁴⁸ Queanbeyan is at the Australian Capital Territory border, about 6-8 miles E. of Canberra.
²⁴⁹ Recorded as *latipennis* by Sjöstedt (Bihang K. Svenska Vetenskapsakad. Handl. (3) 15 (2): 77 (1935)), the material bearing his identification labels.

²⁵⁰ Alpine Creek runs "S. to Eucumbene River a few miles E. of Kiandra. The collecting point was probably . . . 6-7 miles ESE. of Kiandra." (Information from Dr. Key, 1948.)

(Division of Entomology Museum, C.S.I.R.O., Canberra). Mt. Coree;²⁵¹ 11.iii.1950 (K. H. L. Key) 5 ♂, 5 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Sawpit Creek,²⁵² 4 miles ENE. of Hotel Kosciusko, Kosciusko Massif; 3.ii.1945 (C. B. Philip and T. G. Campbell) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 4 miles NE. of Hotel Kosciusko, Kosciusko Massif, elev. 4440 ft; 3.iii.1946 (K. H. L. Key) 3 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 6 miles NE. of Hotel Kosciusko, Kosciusko Massif, elev. 4095 ft; 6.iii.1946 (K. H. L. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 7 miles NE. of Hotel Kosciusko, Kosciusko Massif, elev. 3790 ft; 6.iii.1946 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 8 miles NE. of Hotel Kosciusko, Kosciusko Massif, elev. 3490 ft; 6.iii.1946 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Snowy River; 10-15.ii.1934 (A. L. Tonnoir) 1 ♀ (allotype of *laminatus*)²⁵³ (Division of Entomology Museum, C.S.I.R.O., Canberra). 2 miles SSE. of Mt. Adrah, W. of Adelong; 21.ii.1951 (Key and Chinnick) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 4 miles E. of Adelong; 20.ii.1951 (Key and Chinnick) 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 3 miles NE. of Adelong; 21.ii.1951 (Key and Chinnick) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). Tumorrana, NE. of Tumut; 19.ii.1951 (Key and Chinnick) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 2 miles NNE. of Tumut, 20.ii.1951 (Key and Chinnick) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 11 miles W. of Wee Jasper; 19.ii.1951 (Key and Chinnick) 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 5 miles NE. of Wee Jasper; 19.ii.1951 (Key and Chinnick) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). Jeir, NW. of Hall; 10.i.1945 (L. R. Clark) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 5 miles SW. of Taemas Bridge, SW. of Yass; 19.ii.1951 (Key and Chinnick) 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 7 miles S. of Yass; 19.ii.1951 (Key and Chinnick) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). Bookham;²⁵⁴ 18.xii.1935 (A. L. Tonnoir) 47 ♂, 49 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 4 miles E. of Rugby,²⁵⁵ near Boorowa; 30.xi.1918 (K. H. L. and B. Key) 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia).

Australian Capital Territory.—Canberra; Nov. 1935 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Black Mountain, Canberra; 23-30.xii.1937 (W. J. Rafferty) 4 ♀ (Division of Entomology Museum, C.S.I.R.O.,

²⁵¹ At NW. angle of boundary of Australian Capital Territory. Summit, 4657 ft.

²⁵² See Vol. I, p. 125, footnote 178.

²⁵³ Described by Sjöstedt in 1935 (Bihang K. Svenska Vetenskapsakad. Handl. (3) 15 (2): 76) and labelled by him as "allotypus".

²⁵⁴ "Sixteen miles due W. of Yass." (Information from Dr. Key, 1952.)

²⁵⁵ "Sixteen miles ENE. of Boorowa." (Information from Dr. Key, 1953.)

Canberra, and Academy of Natural Sciences of Philadelphia). Mt. Majura;²⁵⁶ 16.ii.1944 (K. H. L. Key) 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Mt. Stromlo;²⁵⁷ 3.iii.1936 (T. G. Campbell) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 9 miles N. of Uriarra Homestead;²⁵⁸ 18.ii.1950 (K. H. L. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). Blundells;²⁵⁹ 21-22.ii.1935 (W. J. Rafferty) 1 ♂, 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia);²⁶⁰ 13.ii.1948 (P. B. Carne) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra); 23.i. and 3.iii.1938 (K. H. L. Key) 7 ♂, 6 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia); 4.i.1953 (K. H. L. Key) 2 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Dunn's Pinch;²⁶¹ elev. 2650 ± 100 ft; 18.ii.1944 (Key and Pryor) 2 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Near Peter's Camp;²⁶² elev. 3800 ± 100 ft; 18.ii.1944 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Peter's Camp;²⁶² elev. 3976 ± 25 ft; 18.ii.1944 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 1 mile NE. of Mt. Tidbinbilla;²⁶³ c. 4400 ft; 25.iii.1951 (K. H. L. Key) 3 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Bendora Arboretum;²⁶⁴ elev. 4126 ± 25 ft; 8.iii.1944 (Key and Pryor) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). W. slope of Mt. Franklin;²⁶⁵ elev. 4750 ft ± 50 ft; 8.iii.1944 (Key and Pryor) 1 ♂, 4 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Snow Gum Arboretum;²⁶⁶ elev. 4700 ± 10 ft; 8.iii.1944 (Key and Pryor) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra); 1.iv.1953 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Aggie-Franklin Saddle, elev. 4501 ± 5 ft; 8.iii.1944 (Key and Pryor) 1 ♂, 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia); 4600 ft, 1.iv.1953 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Mt. Franklin

²⁵⁶ "A hill on the outskirts of Canberra rising to 2920 ft." (Information from Dr. Key, 1953.)

²⁵⁷ "A hill 7 miles W. of Canberra, rising to 2567 ft." (Information from Dr. Key, 1953.)

²⁵⁸ "Uriarra Homestead is 6 miles ENE. of Mt. Coree. Also spelled 'Urayarra'." (Information from Dr. Key, 1950.)

²⁵⁹ See Vol. I, p. 126, footnote 180, and p. 165, footnote 252.

²⁶⁰ This is a portion of the Blundells material recorded by Sjöstedt 1935 as *laminatus*, and one of the females bears his longhand determination.

²⁶¹ "About 2 miles E. of Mt. Coree." (Information from Dr. Key, 1953.)

²⁶² "Two miles SSW. of Mt. Coree, 3975 ft." (Information from Dr. Key, 1953.)

²⁶³ "Seven miles ENE. of Mt. Franklin. The highest point of the Tidbinbilla Range, flanking the Cotter Valley on the east. Altitude of summit, 5124 ft." (Information from Dr. Key, 1953.)

²⁶⁴ "Two and one-half miles air-line, slightly W. of S. of Bull's Head (altitude c. 4125 ft.)." (Information from Dr. Key, 1953.)

²⁶⁵ "A peak on the western boundary (of A.C.T.), about 2 miles N. of the latitude of Tharwa." (Information from Dr. Key, 1949.)

²⁶⁶ See p. 135, footnote 192.

Chalet, 1900 ft; 1.iv.1953 (K. H. L. Key) 2 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 2 miles N. of Mt. Franklin, 4610 ft; 1.iv.1953 (K. H. L. Key) 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Near Lee's Spring,²⁶⁷ elev. 3800 ± 50 ft; (Key and Pryor) 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Bull's Head, elev. 4325 ± 25 ft; 18.ii.1944 (K. H. L. Key) 2 ♂, 6 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Bull's Head Lookout, elev. 4200 ± 50 ft; 18.ii.1944 (K. H. L. Key) 2 ♂, 4 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia).

The synonymy here established represents the result of a most critical analysis of the above-listed material, including as it does Sjöstedt's allotype of *laminatus*, and part of the material from Lake George which had been determined by that author as Stål's *latipennis*. Hence, while the single types were not studied, I have had before me material which has had the benefit of such comparison.

The paucity of the original material, the failure of both Stål and Sjöstedt to recognize that *Praxibulus* has well-marked intra-specific colour phases, and a disregard of sexual differences, were responsible for the synonymy here established, and also for Sjöstedt's failure to recognize the situation. Stål's type of *laminatus* was a male in the usual brown phase of that sex; the type of his *latipennis* was a green phase female. Even after Sjöstedt had described a green phase female (now before me) as the allotype of *laminatus*, that author continued to regard the two "species" as distinct, and in presenting a key to distinguish them gave a number of features, which the present very extensive series show are merely points of individual variation, all to be found fully represented in series from a single locality.

The unique male type of *laminatus* and the similarly unique female type of *latipennis*, both studied by Sjöstedt in 1921, and originally part of the Brunner Collection, are now in the Vienna Museum.

As none of the previous descriptions of *laminatus* fully present the features of the typical subspecies, the following comments have been drawn from a representative pair from 1 mile W. of Mittagong, N.S.W.²⁶⁸

Male.—Size medium; form subcompressed; surface relatively smooth except the dorsum of the pronotum and the metazona and the ventral section of the prozona of the lateral lobes of the same, which are distinctly impresso-punctate.

Head with the eyes moderately prominent, the greatest breadth across the eyes but slightly greater than the breadth across the genae as seen from the dorsum; fastigium as seen from the dorsum with its general outline slightly

²⁶⁷ "A point 2 miles N. of Bull's Head, and just E. of the western boundary of the Territory." (Information from Dr. Key.)

²⁶⁸ Material from this general region has been used as it is more probable that areas relatively close to Sydney were the source, prior to 1878, of the original material on which the species was based.

more obtuse than a right angle, the apex well rounded, fastigial length cephalad of the eyes but five-elevenths of the greatest fastigial breadth at its widest point caudad, fastigial disk well excavate, longitudinally subovate in outline, open caudad, with a faint medio-longitudinal carinula which continues over the occiput, interspace between the eyes slightly less than three-fourths the greatest fastigial breadth (as 15 to 22); fastigio-facial angle as seen in profile rounded with a weak but distinct subangulation cephalad of the dorsal point of the eyes; facial outline retreating and evenly but rather shallowly convex; occipital line as seen in profile moderately ascending to the interocular region, the dorsal line of the fastigium weakly declivent to the fastigio-facial angle; frontal costa at narrowest point, i.e. immediately ventrad of the fastigio-facial juncture, not quite equal in breadth to half the greatest fastigial width (as 10 to 22), thence ventrad with its lateral margins evenly diverging and subobsolete near the clypeus, surface of costa impresso-punctate with a short and shallow juxta-ocular sulcation. Eyes as seen in profile with basal outline ovoid, subacute dorso-cephalad, dorsal and caudal borders broadly arcuate, cephalic border very shallowly convex, greatest breadth of outline equal to approximately two-thirds of the greatest depth of the same (as 31 to 46), the latter slightly more than three times the length of the infra-ocular space (as 46 to 14). Antennae nearly twice as long as the exposed dorsal length of the head (as 100 to 55), composed of 22 clearly defined articles, these longest mesad, the apex blunt.

Pronotum with its dorsum about 1.5 times as long as the exposed dorsal surface of the head, greatest caudal width of the pronotal dorsum equal to five-sixths the length of the same (as 60 to 73), greatest breadth caudad across lateral lobes but slightly less than the pronotal length (as 68 to 73), the disk faintly clepsydral, moderately narrowed briefly in advance of the first transverse sulcus, thence widening moderately both cephalad and caudad; cephalic margin of disk moderately arcuate, caudal margin of same nearly truncate but with a subobsolete and very faint obtuse-angulation mesad, least width of disk (at first transverse sulcus) but slightly more than half the greatest (caudal) breadth of the same (as 33 to 60); median carina well marked, moderately elevated, narrowly polished, intersected by all three transverse sulci, lateral carinae distinct but low, much less marked than the median, intersected by all three transverse sulci; surface of disk distinctly rugulose and subcribrosely impresso-punctate, prozona occupying about five-eighths of the total length of the disk (as 47 to 73); lateral lobes with their depth equal to ten-thirteenths of their dorsal length (i.e. at lateral carinae of the disk) (as 50 to 65), intra-marginal cephalic sulcus deeply indicated and reaching ventrad close to the vicinity of the ventro-cephalic angle, first transverse sulcus not carried on to the lateral lobes, the second and third (principal) ones reaching to the ventral portion of the lobes, cephalic margin oblique, faintly convex, ventro-cephalic angle very low obtuse, ventral margin nearly straight oblique cephalad and caudad, these sections joined at a median obtuse-angulation, ventro-caudal angle obtuse, caudal margin obliquely sinuate; surface of lobal metazona and ventrad on the prozona, as well

as the immediate vicinity of the cephalic margin of the lobes, deeply impresso-punctate.

Tegmina equal in length to three-fourths that of the pronotum (as 55 to 73), their apices reaching to the middle of the second abdominal tergite, greatest breadth of tegmen as viewed in dorso-lateral aspect approximately equal to three-fifths the tegminal length (as 34 to 56); costal margin gently arcuate but distad strongly curving to the arcuate-truncate distal margin, sutural margin low arcuate with the disto-sutural angle narrowly rounded obtuse, in transverse section the anal area of the tegmina is subangularly cut off from the low arcuate breadth of the marginal and discoidal sections; venation well marked, particularly the longitudinal elements, the anal vein much more strongly marked and elevated than any other, moderately arcuate and forming a marked division of the tegminal surface transversely.

Abdomen with medio-longitudinal carina well emphasized except distad, the more proximal tergites definitely tectate dorsad, the whole subcompressed proximally; ultimate tergite without furcula; supra-anal plate with its more distal portion as characteristic for the genus, the proximal crest strongly developed and elevated mesad into a transverse arcuate lobation, the outline of which regularly descends laterad and bears lateral low nodules which are shallowly separated from the general outline of the median lobation (see Plate 24, Figs. 308-310), the free section of the whole proximal crest, as well as the regular rugae of the more distal section of the plate heavily marked with blackish, as usual in the genus; cerci compressed, their apices falling but little short of that of the subgenital plate, as seen in profile of subequal breadth in proximal half, thence regularly narrowing to the attenuately acute and slightly decurving apex; subgenital plate bluntly subconical in general form in dorsal, lateral, and caudal aspects, the apex bluntly rounded, particularly as viewed from the dorsum.

Prosternal process transversely trigonal, subacute, well marked. Mesosternal interspace narrow, strongly longitudinal, over twice as long as its least width, mesosternal lobes subquadrate, mesocaudal angle well rounded, caudal margins moderately oblique; metasternal lobes subcontiguous caudad of the foveolae.

Cephalic and median femora moderately robust and appreciably, but not strongly, inflated, the latter more evident in lateral than in dorsal aspect. Caudal femora with their apices surpassing that of the abdomen by a distance but slightly less than the length of the pronotal dorsum, in form moderately robust, their greatest depth (at proximal fifth) contained 3.8 times in their length (as 17 to 65), the least depth, at the pregenicular constriction, but slightly more than one-third the greatest depth (as 6 to 17), longitudinal carinae, except the weaker dorso-external one, well marked, paginal pattern regular in form and emphasis, genicular lobes rounded distad; caudal tibiae slightly shorter than the femora, external and internal margins each with nine spines.

Female.—Size in general one-third larger than the male; form stouter, less compressed, blunt subfusiform; surface sculpture essentially as in male.

Head with eyes much less prominent than in male, the whole bluntly subconoid as seen from the dorsum, breadth across eyes subequal to that across genae as seen from the dorsum; fastigium as seen from the dorsum broadly obtuse-angulate in outline, the apex very broadly rounded, fastigial length cephalad of the eyes equal to but one-third of the greatest fastigial breadth at its widest point caudad, fastigial disk very shallowly excavate, the excavation transverse subpentagonal, open caudad, medio-longitudinal carinula subobsolete but more evident, yet weak, on the occiput, interspace between the eyes subequal to five-sixths of the greatest fastigial breadth (as 25 to 32); fastigio-facial angle more broadly rounded than in the male as seen in profile and without an evident subangulation, passing regularly ventrad into the retreating and evenly arcuate facial outline, occipital and fastigial profile evenly arcuate; frontal costa broad, evenly but not strongly widening ventrad to median ocellus, at narrowest point with the same proportionate ratio as in the male, surface of costa rather thickly impresso-punctate and without sulcation. Eyes as seen in profile with outline and proportions essentially as in the male, the depth of outline equalling 2.3 times that of the infra-ocular space (as 50 to 22). Antennae as in male but subequal in length to the dorsal length of the pronotum.

Pronotum broad and robust, with its dorsal length compared with that of head as in male, greatest breadth of pronotal dorsum caudad subequal to the pronotal length, greatest breadth caudad across lateral lobes slightly greater than the pronotal length (as 105 to 98), the disk regularly broadening caudad, the discal width at caudal margin 1.6 times as great as that at cephalic margin, the lateral borders nearly straight divergent caudad; cephalic margin of disk less strongly arcuate than in male, caudal margin very weakly and shallowly subobtuse-angulate, the rounded angle obsoletely emarginate mesad (entire in certain individuals), surface of disk of pronotum shallowly tectate; median carina as in male but not quite as coarsely marked, lateral carinae low but well marked on the prozona, subobsolete on the metazona, traversed by all three transverse sulci, prozona occupying five-ninths of the pronotal dorsum (as 55 to 98); lateral lobes with proportions, margins, and surface sculpture as in male.

Tegmina with length proportionately as in the male, but, as usual in the female sex of this genus, broad and in general outline subquadrate, the greatest breadth subequal to six-sevenths of the greatest length; costal and distal margins as in male,²⁶⁹ disto-sutural angle slightly more broadly rounded than in the male described, sutural margin low arcuate, in transverse section the tegmen is somewhat flatter and much less appreciably divided into two surface planes; venation with its longitudinal elements marked, those of the trunk virtually as pronounced as the anal vein, which is not the case in the male.

Abdomen with medio-longitudinal carina as distinct but less sharply marked than in the male, weak distad, proximal tergites less strongly tectate than in

²⁶⁹ The distal margin is faintly emarginate mesad in one tegmen of the described female, not in the other. This is a feature of individual variability in the extensive material of this subspecies now before me.

male; supra-anal plate trigonal, the proximal breadth and median length subequal, the lateral margins of the distal half straight convergent to the acute apex, transverse impression marked, no distinct medio-longitudinal sulcation, surface of proximal half transversely arcuate mesad, of distal half deplanate with strongly declivent lateral sections; cerci tapering acuminate, the apices acute but failing to reach the distal margins of the infra-cercal plates; ovipositor valves of moderate build, apices fairly well recurved, dorsal surface of dorsal valves and ventral one of ventral valves appreciably excavate within margins, lateral plates of ventral ovipositor valves acuminate distad, dorsal margin arcuate in distal half; subgenital plate with its ventral surface deplanate mesad, with a lateral longitudinal fold or carinula bordering on each side of the deplanate area distad,²⁷⁰ distal margin moderately produced mesad with an obliquely disposed concave section of the margin ventrad of each ventral ovipositor valve.

Prosternal process transversely lamellate, low arcuate in outline, much broader and lower than in male, its caudal surface subexcavate. Mesosternal interspace moderately transverse, about 1.5 times as broad as deep, mesosternal lobes each 1.3 times as broad as the interspace, the margins arcuate to varying degrees, the meso-caudal angle broadly rounded; metasternal lobes separated caudad of the foveolae by an interspace faintly narrower than that between the external margins of the ovate contiguous foveolae.

Cephalic and median femora subequal in length to those of the male but much more slender and not at all inflated. Caudal femora with their apices surpassing the tips of the ovipositor by a distance subequal to half the pronotal length, their greatest depth contained four times in their length (as 20 to 80), paginal pattern denser and more closely placed, other details as in male; caudal tibiae as in male.

MEASUREMENTS (mm) ²⁷¹

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Width of Pronotum Across Lateral Lobes	Length of Fegmen	Length of Caudal Femur
♂, Trunkey, N.S.W.	13.2	4.8	3.4	3.0	2.6	9.7
♂, 15 miles NE. of Cowra, N.S.W.	14.3	5.0	3.5	3.4	3.7	9.9
♂, 1 mile W. of Mittagong, N.S.W. (specimen here described)	14.8	5.0	3.6	3.4	2.9	10.5
♂, 4 miles W. of Wingello, N.S.W.	13.8	4.8	3.4	3.0	3.4	9.7

²⁷⁰ Concerning variability in the strength or character of these structures see discussion under "Variation" of this subspecies.

²⁷¹ As elsewhere in these studies, unless otherwise stated, the measurements of two individuals from the same locality represent the evident extremes before me from that point.

MEASUREMENTS (mm) (*Continued*)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Width of Pronotum Across Lateral Lobes	Length of Tegmen	Length of Caudal Femur
♂, 4 miles W. of Wingello, N.S.W.	14.8	4.9	3.7	3.3	3.2	10.2
♂, Sassafras, N.S.W.	13.5	4.8	3.5	3.2	2.6	9.7
♂, Sassafras, N.S.W.	15.3	5.2	3.7	3.4	3.0	10.1
♂, 17 miles NE. of Braid- wood, N.S.W.	13.8	4.8	3.2	3.0	2.4	8.8
♂, 13 miles NE. of Braid- wood, N.S.W.	15.0	4.7	3.9	3.5	3.4	10.5
♂, Monga, N.S.W.	13.5	4.4	3.5	3.1	2.7	9.6
♂, Monga, N.S.W.	14.7	5.2	4.2	3.7	3.4	10.2
♂, 4 miles SW. of Captain's Flat, N.S.W.	14.3	5.2	3.4	3.2	2.9	9.7
♂, 4 miles SW. of Captain's Flat, N.S.W.	17.2	5.2	4.0	3.5	3.2	10.4
♂, Alpine Creek, N.S.W.	13.5	4.8	3.5	3.4	3.0	10.4
♂, Alpine Creek, N.S.W.	15.0	5.0	3.7	3.4	2.9	10.9
♂, C. 5 miles NNE. of Mt. Coree, N.S.W.	13.7	5.2	3.5	3.3	3.0	10.1
♂, Mt. Coree, N.S.W.	15.0 ²⁷²	5.3	3.9	3.3	3.4	10.5
♂, 6 miles NE. of Hotel Kosciusko, Kosciusko Massif, N.S.W.	14.5	5.0	3.4	3.3	3.7	10.1
♂, 4 miles E. of Adelong, N.S.W.	12.7	4.4	3.0	2.7	3.0	9.1
♂, 5 miles SW. of Taemas Bridge, N.S.W.	15.0	4.8	3.5	3.4	3.5	10.5
♂, Bookham, N.S.W.	13.2	4.5	3.4	3.2	2.9	9.2
♂, Bookham, N.S.W.	14.5	5.0	3.7	3.4	3.9	9.6
♂, Blundells, A.C.T.	13.2	5.2	3.4	3.4	2.7	9.4
♂, Blundells, A.C.T.	14.7	4.8	3.5	3.5	2.9	10.1
♂, 1 mile NE. of Mt. Tid- binbilla, A.C.T.	16.1	4.5	3.5	3.2	2.7	9.9
♂, 1 mile NE. of Mt. Tid- binbilla, A.C.T.	16.5	4.8	3.7	3.5	3.5	10.4
♂, Bendora Arboretum, A.C.T.	13.3	5.0	3.5	3.2	2.7	10.1
♂, Snow Gum Arboretum, A.C.T.	13.4	4.8	3.4	3.2	3.0	9.7
♂, Dunn's Pinch, A.C.T.	15.5	4.5	3.5	3.2	2.9	9.7
♂, Aggie-Franklin Saddle, A.C.T.	13.0	4.8	3.2	3.4	2.4	8.9
♂, Mt. Franklin Chalet, A.C.T.	13.5	5.2	3.3	3.4	2.9	10.5

²⁷² Apex of abdomen unusually recurved and hence length somewhat shortened.

MEASUREMENTS (mm) (*Continued*)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Width of Pronotum Across Lateral Lobes	Length of Tegmen	Length of Caudal Femur
♂, Mt. Franklin Chalet, A.C.T.	14.4	5.3	3.6	3.5	3.5	10.5
♂, Bull's Head, A.C.T.	14.5	5.2	4.0	3.5	3.0	10.2
♂, Bull's Head Lookout, A.C.T.	14.0	4.4	3.5	3.3	2.7	9.6
♀, Trunkey, N.S.W.	19.8	5.2	5.3	5.0	3.7	13.2
♀, 15 miles NE. of Cowra, N.S.W.	18.9	5.2	4.4	4.7	3.9	13.0
♀, 15 miles NE. of Cowra, N.S.W.	19.0	— ²⁷³	4.7	5.0	3.4	13.0
♀, Forster, N.S.W.	16.5 ²⁷⁴	— ²⁷³	5.2	5.2	3.5	14.5
♀, Forster to Cape Hawke, N.S.W.	21.0	5.7	5.7	5.8	4.2	15.1
♀, 1 mile W. of Mittagong, N.S.W. (specimen here described)	19.2	4.8	4.9	5.5	3.6	12.3
♀, Bowral, N.S.W.	18.2 ²⁷⁴	5.8	5.7	6.0	3.9	13.5
♀, 1 mile W. of Bowral, N.S.W.	16.5 ²⁷⁴	4.8	4.2	4.7	3.5	11.4
♀, 22 miles NE. of Braid- wood, N.S.W.	16.4 ²⁷⁴	4.4	4.8	4.8	3.0	12.2
♀, 1 mile N. of Braidwood, N.S.W.	17.8	4.7	4.7	5.2	3.2	12.7
♀, Monga, N.S.W.	17.9	5.0	4.8	5.0	3.5	12.5
♀, Monga, N.S.W.	18.9	4.7	4.5	4.8	3.2	11.8
♀, Captain's Flat, N.S.W.	15.9 ²⁷⁴	4.5	4.2	4.7	3.2	12.2
♀, Captain's Flat, N.S.W.	18.0	4.8	5.2	5.2	3.0	12.4
♀, 8 miles E. of Quean- beyan, N.S.W.	14.2 ²⁷⁴	4.0	4.2	4.2	2.2	10.7
♀, 2 miles E. of Molonglo Station, N.S.W.	20.5	5.3	4.7	4.8	2.9	12.7
♀, Lake George, N.S.W.	19.0	— ²⁷³	4.8	5.3	3.0	13.5
♀, Lake George, N.S.W.	20.0	5.3	5.2	5.7	3.5	13.6
♀, Alpine Creek, N.S.W.	18.1	4.7	4.8	4.8	3.4	12.8
♀, Alpine Creek, N.S.W.	21.0	5.5	5.8	6.0	4.5	14.3
♀, Mt. Coree, N.S.W.	20.0	5.8	5.2	5.3	3.4	13.5
♀, Mt. Coree, N.S.W.	21.5	5.8	5.8	6.1	4.4	14.6
♀, 4 miles E. of Hotel Kos- ciusko, Kosciusko Massif, N.S.W.	17.0	4.8	4.5	4.7	4.0	11.4
♀, 4 miles E. of Hotel Kos- ciusko, Kosciusko Massif, N.S.W.	18.9	5.0	5.0	5.2	4.0	12.7

²⁷³ Lacking or incomplete.²⁷⁴ Abdomen unusually contracted.

MEASUREMENTS (mm) (Continued)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Width of Pronotum Across Lateral Lobes	Length of Tegmen	Length of Caudal Femur
♀, Snowy River, N.S.W., <i>allotype</i>	20.0	5.3	4.4	4.7	3.4	11.4
♀, Tumorrana, N.S.W.	16.5	5.0	4.5	4.5	3.2	12.0
♀, 9 miles NNE. of Tumut, N.S.W.	17.5	5.2	3.7	4.7	2.7	12.3
♀, 5 miles SW. of Taemas Bridge, N.S.W.	15.0 ²⁷⁴	4.8	4.1	4.2	3.0	11.2
♀, 11 miles W. of Wee Jasper, N.S.W.	18.0	4.8	4.7	4.8	4.0	13.0
♀, 11 miles W. of Wee Jasper, N.S.W.	19.6	5.7	4.8	4.8	3.5	13.0
♀, Bookham, N.S.W.	14.9	4.4	3.7	4.0	3.0	10.5
♀, Bookham, N.S.W.	17.0	5.3	4.8	5.3	3.2	12.3
♀, 7 miles SW. of Crookwell, N.S.W.	18.0	5.2	5.5	5.5	3.5	13.8
♀, 4 miles E. of Rugby, N.S.W.	15.6 ²⁷⁴	5.5	4.7	4.7	3.4	12.7
♀, Black Mountain, A.C.T.	18.5	5.0	4.8	5.2	3.4	13.2
♀, Black Mountain, A.C.T.	18.3	5.3	5.2	5.3	4.2	14.0
♀, Blundells, A.C.T.	18.0	— ²⁷³	4.4	4.7	3.5	12.2
♀, Blundells, A.C.T.	18.2	5.5	5.7	6.0	3.5	14.0
♀, 1 mile NE. of Mt. Tidbinbilla, A.C.T.	19.8	5.0	5.2	5.2	3.2	13.2
♀, Snow Gum Arboretum, A.C.T.	17.8	5.7	5.0	5.3	3.7	13.0
♀, Dunn's Pinch, A.C.T.	20.0	4.4	4.8	4.8	3.2	12.5
♀, W. slope of Mt. Franklin, A.C.T.	18.7	5.0	4.8	5.2	3.2	12.5
♀, W. slope of Mt. Franklin, A.C.T.	20.2	5.0	4.4	4.8	4.0	12.2
♀, Aggie-Franklin Saddle, A.C.T.	16.9	5.2	4.2	4.5	3.2	11.5
♀, Bull's Head, A.C.T.	17.1	4.8	4.8	4.8	3.4	12.2
♀, Bull's Head, A.C.T.	19.6	5.5	5.0	5.0	3.7	12.5
♀, Bull's Head, A.C.T.	17.5	4.5	4.8	5.0	3.4	11.5

The above measurements present the extremes of series or the dimensions of single individuals from localities which for various reasons are worthy of note. They demonstrate a considerable amount of individual size variation at some localities, and very little at others. An analysis of them, as well as a checking over of the whole series, shows that the typical subspecies of *laminatus* develops its greatest size in areas of moderate elevation, these extending from the eastern border of its distribution westward to some, but not all, of the areas of higher altitude in New South Wales and the Australian Capital Territory. From

these higher levels the average size decreases as the western and north-western border of its range is approached. In this peripheral section the terrain breaks down to the Murray-Darling plain, or the upper valleys of its various stream bodies.

While most of the representations from the more elevated points in the Australian Alps are quite large in their individual size, others show a size reduction, both of which conditions probably are responses to the varying control of immediate environmental or survival factors. The larger series from Captain's Flat and Bookham, which exhibit the extremes in both sexes above noted, show conclusively the broad geographic size tendency above outlined, that from Captain's Flat (altitude in excess of 3000 ft) being well above average, with the largest male measured, while the Bookham series (altitude slightly over 2000 ft) is in the lower third of average body size. The last-mentioned locality is virtually marginal, to the north-west of the centre of the subspecies's distribution, and close to the Murrumbidgee (Murray drainage) River, while Captain's Flat is distinctly more central in the subspecies's distribution. Certain of the highest elevations represented show some of the largest individuals seen, among these Mt. Coree (summit, 4657 ft), Alpine Creek, Mt. Franklin (4750 ft), and 1 mile W. of Mt. Tidbinbilla (4400 ft), while other similarly elevated localities, such as Bendora Arboretum (4126 ft) and Snow Gum Arboretum (4700 ft) are represented by individuals of definitely smaller size. The smallest male seen is from the Adelong district, and one of the smallest females is from 8 miles E. of Queanbeyan, near the upper Molonglo, probably representing a lowland influence extending up that river valley from the Murrumbidgee. Another very small female is from Bookham. The largest male is, as above stated, from Captain's Flat, the largest female from Mt. Coree.

Coloration.—Both the green and brown colour phases are present in the series of this subspecies before me, with the brown phase more abundantly represented. However, we do not know definitely whether this holds true of a specific population. No males in the extreme condition of the green phase have been seen, and those showing more of a tendency in that direction are chiefly from points along the western periphery of the subspecies's distribution (i.e. Wee Jasper, Bookham, and Wagga [the latter intermediate between *P. l. laminatus* and *P. l. ulnaris*]), although one from Blundells is from one of the higher localities. Green phase females are included in all locality representations of any size.

In the extensive Bookham series the dorsum of the pronotum in the males varies materially in the depth of its tone. Occasional males from numerous localities have the anal area of the tegmina slightly paler and appreciably contrasted. Green phase females show a considerable degree of variation in the extent to which the lateral lobes of the pronotum are invaded by brown tones.

Speaking broadly colour tones average paler in individuals from near the western border of the subspecies's distribution adjacent to the Murrumbidgee River. The individuals intermediate between *P. l. laminatus* and *P. l. ulnaris* from Wagga are exceedingly pale in both sexes, in both their buff and their

green tones. The extensive Bookhami series averages rather pale, some, and particularly females, very pale, the brown phase females at this locality very much outnumbering those in the green phase. The Alpine Creek representation has all of its females in the green phase, with one female from Mt. Coree similarly coloured, but with the others from the latter locality, and all Mt. Kosciusko individuals in the brown phase.

High mountain individuals average relatively dark, although this varies individually in series such as that from Bull's Head. Green phase females are present at these localities, and are usually strongly patterned, but except at Alpine Creek they are less frequent than brown phase females. Four of the Mt. Franklin Chalet females are in the brown phase, the others nearer the green one.

The degree to which the external (paginal) face of the caudal femora is infusate dorsad, and whether this, if present, is solid or definitely broken into two or three sections by paler intervals, is purely individual, and irrespective of sex or colour phase. Similarly the degree to which the region of the anal vein of the tegmina of females is paler and contrasted with the coloration of the tegminal discoidal field similarly is seen to be individual, and is not linked to a specific colour phase nor controlled by locality. It is quite probable that both of these last mentioned colour features have a genetic background, as is known to be true of the elements of many other acridoid pattern types.

The chief characteristics of the coloration of the two phases, as drawn from representative individuals, are as follows:

*Male (brown phase).*²⁷⁵—General pattern as usual in the genus, having paired lateral dark post-ocular bars extending across the head, dorsal portion of the lateral lobes of the pronotum, involving the pleura, much of the discoidal field of the tegmina and laterad along the abdomen as uniformly wide continuations, the vicinity of the anal vein of the tegmina is generally pale, the limbs relatively pale and areally darkened. General base colour ranging from ochraceous-tawny to ochraceous-buff, solid on the face, on most of the genae, areas of the ventral section of the lateral lobes of the pronotum, oblique areas on the pleura, most of the abdomen (dorsad and ventrad) and on all of the venter, and in many of the brown-phase male individuals also on all or the greater part of the dorsum of the fastigium, occiput, and disk of the pronotum (this in the indicated male from 1 mile W. of Mittagong). The post-ocular sections of the dark bars on the head are relatively solid, the pale genae with darker ghost lines, the occiput when paler has a few arcuate stippled darker lines, the eyes are of varying tones of dark brown, antennae dresden brown becoming mummy brown distad to an opposite extreme in which they pale to light ochraceous-buff proximad. Pronotum with median carina always fuscous, median section of prozona of lateral lobes with buffy continuations of a pale ventral bordering of the post-ocular dark bars of the head, ventral half of lateral lobes areally overwashed

²⁷⁵ These comments are drawn from a male from 1 mile NW. of Moss Vale, N.S.W., with those on the paler condition taken from the structurally described male, which is from 1 mile W. of Mittagong, N.S.W.

with clear dull green-yellow (of Ridgway) to citron yellow. Tegmina with the contrast of the pale pencilling about the anal vein with the general tone varying in emphasis in relation to the general depth of the whole tone, i.e. more pronounced in those with the darker general shade. Abdomen with the evenly wide dorsal area always contrasted with the darker lateral bars, the borders of the proximal crest of the supra-anal plate and the raised pattern on the disk of the same plate fuscous black, the apices of the cerci also darkened. The cephalic and median femora are washed with tawny of variable strength, the corresponding tibiae tinted with the same. The caudal femora have the external pagina infusate near the dorso-lateral carinae, this becoming dilute ventrad, and the same clouding may at times be broken into subobsolete bandings, while the genicular arches are infusate, on the internal face also involving the proximal portion of the genicular lobes, the remainder of which are creamy-buff; caudal tibiae pale glaucous, this weakened or embrowned proximad, spines whitish, black tipped; caudal tarsi glaucous.

*Female (brown phase).*²⁷⁶—General pattern as in the brown phase male except that the face and ventral portion of the genae are more infusate, and with the paler areas of the lateral lobes virtually central in position. General base colour somewhat darker than in the males, ranging from russet to sayal brown, sometimes somewhat paler on the occiput than on the dorsum of the abdomen. Post-ocular dark bars on the head usually solid and bordered ventrad by a narrow whitish line; occipital arcuate lines indicated but weakly; eyes and antennae as in male. Pronotum with median carina not contrasted; pale patch mesad on lateral lobes quite strongly contrasted with the fuscous portion of the lateral bars dorsad of it and a similar small dark area ventrad between the intra-marginal and first transverse sulci, the extreme ventral portion of the lateral lobes of the general tone, in occasional females (such as that from 1 mile W. of Mittagong) the cephalic border, the pale median area, and all of the metazonal section of the lateral lobes are strongly washed with lumiere green. Tegmina with pattern as in brown phase males, the breadth of the anal pale fascia varying individually, intimation of a similar pale fascia about the discoidal vein occasionally indicated, most of the other longitudinal veins perceptibly and finely pencilled with fuscous. Abdomen with pattern as in brown phase males, the tips and sectorial margins of the ovipositor valves washed with fuscous-brown. Limbs essentially as in brown phase males but the infuscation of the pagina of the caudal femora is more extensive ventrad and somewhat contrasted by the pale lining of the ventro-external carina; the caudal tibiae occasionally have the glaucous quite pale, and approaching olive-buff proximad.

Male (green phase).—The nearest approach seen in this sex to the green phase is here compared with the above-mentioned pale brown phase male from the same locality (i.e. 1 mile W. of Mittagong). It has the same base pattern and tones, with the following additional elements: ventral half (prozona) to

²⁷⁶ These comments are drawn from a female from Monga, N.S.W., with the paler extreme taken from the structurally described female, which is from 1 mile W. of Mittagong, N.S.W.

two-thirds (metazona) of the lateral lobes of pronotum, aside from a quadrate buffy post-ocular continuation mesad between the first and second transverse sulci, green-yellow, median carina of caudal femora weakly pencilled proximad with the same, genicular arches of same femora prout's brown, neither genicular lobe with a dark vertical transverse bar.

Female (green phase).—Pattern elements essentially as in females of the brown phase, with the following differences: face to and including the dorsal half of the clypeus solidly lumiere green to pale apple green; occiput similar with a yellowish tinge, the fastigial border cephalad sometimes edged with straw yellow, dorsum of pronotum paling to chalcedony yellow, but with the lateral lobes, except for a restricted remnant of the dark post-ocular bar and its usually dull buffy accompanying area, bright apple green; dorsal surfaces of the proximal three-fourths of the caudal femora similarly bright apple green.

Variation.—Size and coloration have already been discussed. Fluctuations in the ratio of width caudad across the lateral lobes of the pronotum to the greatest dorsal pronotal length are quite marked, but this is evident almost entirely in the female sex, as an examination of the preceding measurements will make evident. These fluctuations in relative pronotal breadth, as in numerous other cyrtacanthacridines, appear to be purely individual and without regional association or implication.

The two most obvious and most confusing variational tendencies are in the general outline of the median production of the proximal crest of the male supra-anal plate, and the presence or absence, and degree of emphasis when present, of lateral carinate folds or marked carinae distad on the female subgenital plate. Both of these features have been carefully weighed, and the following notes from some of the series support the conclusion that these fluctuations are purely individual and not clearly correlated with specific localities or areas.

The 47 males in the Bookham series have the outline of the median production of the proximal crest of the supra-anal plate arcuate conforming to what can be regarded as the norm for the species in 32 individuals, with a definitely emarginate apex in eight, with this area deeply and strongly emarginate, hence virtually bilobate, in two, with the whole production narrow, but relatively higher and with the apex rounded and entire in one, much broader but entire and non-emarginate in outline in three, and clearly abnormal and teratoid²⁷⁷ in a single specimen. Of the Captain's Flat series of 12 males four have the apex deeply bifid, two have it emarginate, and six present the norm. Definitely emarginate apices are also found in a number of males from the higher altitudes, yet from Blundells only two are shallowly emarginate of a total of eight. However, over the full range of the subspecies what is here regarded as the normal form of this section of the proximal crest, i.e. a transversely broadly rounded non-emarginate lobation, predominates. While the extreme condition of this emarginate tendency suggests *P. duplex*, the general form of

²⁷⁷ This individual has the whole plate distorted and atrophied.

the median production of the proximal crest is never of the subquadrate type found in that quite distinct species.

The sculpture of the surface of the female subgenital plate distad, where the ventral surface joins the subvertical lateral ones, ranges in character from an even rounded passage from one surface to the other, to an opposite extreme which shows in this area on each side definite longitudinal straight carinae accompanied by a parallel fold of the chitin. Between these two poles there is a regular gradation. Of the 49 females from Bookham, 4 have the plate rounded without carinae or folds, 11 show almost no carinae, 16 show low rounded carinae, and 18 have them well developed. Of the 16 females from the general Captain's Flat area, 13 have the carinae strongly marked, and the other 3 have them weakly indicated. The three females from Lake George range from no carinae indicated to these moderately developed. The Forster female has the angles weakly developed, while that from Forster to Cape Hawke lacks them completely. Of nine females from Blindells, seven have the carinae sharp and well developed, one has them moderately indicated, and in one they are very weak, while the two females from Aggie-Franklin Saddle have them rounded and low in one, absent in the other. The four females from Mt. Franklin Chalet have the carinae evident in all, but weak in two, well marked in the others. Well-marked carinae on the subgenital plate are indicated in the majority of the females,²⁷⁸ and particularly in those from the higher elevations,²⁷⁹ and this is the more usual condition in the species. Material from along the western border of the subspecies's range, aside from the Bookham material, shows no strongly marked carinae on this plate, these being weak or subobsolete. It is clearly evident that the presence or absence of these carinae is purely individual, and is without taxonomic significance or geographic correlation.

Distribution.—South-eastern New South Wales largely back from the coastal belt south of Broken Bay, but reaching to the sea northward in the Forster area of Gloucester County, and excluding the lower levels of Riverina and the Darling plains on the west. The northernmost points from which *I. laminatus* is now known are the Forster and Cape Hawke area on the coast, and the Bathurst and Wallerawang districts of the Main Range, from which latter section it ranges eastward to Forster and south-eastward to the edge of the scarp in Camden and St. Vincent Counties, and to the westward to the region of the upper Lachlan (Cowra district) and that of Adelong and Tumut on the Tumut River (Murrumbidgee drainage). Southward in the more elevated territory it extends at least to the Snowy River and the Kosciusko Massif of the Australian Alps. It is not known, however, whether true *laminatus* extends over any of the higher levels into Victoria. As discussed under *P. I. ulnaris* that subspecies and typical *laminatus* clearly intergrade about Wagga at the eastern border of the Riverina of central southern New South Wales. Intergradation of typical

²⁷⁸ The allotype from Snowy River has them moderately sharp.

²⁷⁹ However, one from Mt. Franklin has no carinae, while two from the same peak have them sharply indicated.

lamiatus northward into *l. actus* has not been established from material, but there is every reason to believe it occurs in territory between the distributional areas of typical material of the respective subspecies.

PRAXIBULUS LAMINATUS ACTUS²⁸⁰ n. subsp.

Plate 17, Figs. 188-191; Plate 24, Figs. 313 and 314; Plate 25, Figs. 315-317

This northern subspecies of *laminatus* can readily be distinguished from the typical form of the species by the much narrower median lobation of the proximal crest of the male supra-anal plate, the more rounded fastigio-facial angle of the same sex and its dorsad rather narrower frontal costa, which latter is also more regularly broadening ventrad and as a whole more definitely sulcate, while the female sex has the frontal costa somewhat narrower dorsad than in the same sex of *l. laminatus*. While the intergradation of this subspecies into *l. laminatus* has not been established by material, its differences are clearly of no greater value, and there can be little question but that representatives from intervening districts, not now available, will support this position.

Type.—♂; Coolah to Cassilis,²⁸¹ N.S.W. November 1936 (K. H. L. Key) (Division of Entomology Museum, C.S.I.R.O., Canberra).

The following are the noteworthy features of difference from *P. l. laminatus*.

General form and size essentially as in *l. laminatus* except that the pronotum is somewhat narrower as seen from the dorsum. Head with the fastigio-facial angle as seen in profile more broadly rounded than in the male of *l. laminatus*, the surface of the fastigial portion more broadly and roundly declivent, the more advanced (i.e. cephalic) point of the head approximately on a line with the central axis of the eye, rather than with a point somewhat dorsad, as in *l. laminatus*; frontal costa dorsad, at the fastigio-facial angle, somewhat narrower than in *l. laminatus*, regularly widening thence ventrad to below the median ocellus, the margins more straight divergent than in *l. laminatus* in which they are weakly arcuate, the whole surface of the costa narrower than in the male of *l. laminatus*, the surface, particularly dorsad of the median ocellus, more definitely sulcate. Eye in profile with the base outline having all its elements except the cephalic section more broadly arcuate and hence more rounded than in *l. laminatus*, although the ratio of breadth to depth is essentially the same. Supra-anal plate with the proximal crest having the median lobation much narrower than in *l. laminatus*, its breadth at base slightly less than half that of the entire thickened and infusate specialization of the proximal crest, the median lobation broadly and concavely separated from the relatively smaller lateral nodes of the crest (see Plate 25, Fig. 317), surface of the plate immediately distad of the proximal crest less deplanate than in *P. l. laminatus* and slightly

²⁸⁰ i.e. driven away, in regard to its departure from the typical condition of *P. laminatus*.

²⁸¹ Both of these localities are near the south-western foot of the Liverpool Range, the former adjacent to the head of a tributary of the Macquarie River (Darling system), the latter on a head stream of the Goulburn (Hunter) River, about 25 miles NW. of Merriwa. The elevations are somewhat under 2000 ft.

elevated mesad, elevated areas of the distal scutellar section of the plate less extensive than in *l. laminatus* but of the same basic pattern.²⁸²

Allotype.—♀; same data as type (Division of Entomology Museum, C.S.I.R.O., Canberra).

This specimen has been compared with the allotype of *P. l. laminatus* (selection of Sjöstedt in 1935) and other representative females of that form, and the sole noteworthy difference is that the frontal costa, as in the male, is relatively narrower dorsad, and its surface is also somewhat more sulcate about and ventrad of the median ocellus.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Width of Pronotum Across Lateral Lobes	Length of Tegmen	Length of Caudal Femur
♂, Coolah to Cassilis, N.S.W., <i>type</i>	13.5	5.2	3.2	2.85	2.44	9.2
♂, Coolah to Cassilis, N.S.W., <i>paratype</i>	12.5	4.4	3.2	2.93	2.60	9.1
♂, Coolah to Cassilis, N.S.W., <i>paratype</i>	14.0	5.5	3.4	3.2	3.0	9.9
♀, Coolah to Cassilis, N.S.W., <i>paratype</i>	15.3	4.5	3.9	4.5	2.77	11.5
♀, Coolah to Cassilis, N.S.W., <i>allotype</i>	15.0	5.3	4.2	4.4	3.2	11.8
♀, Coolah to Cassilis, N.S.W., <i>paratype</i>	17.5	5.2	4.4	4.5	3.2	12.0
♀, 5 miles SSW. of Coolah, N.S.W.	17.5	5.2	4.7	4.8	3.2	12.8
♀, 28 miles S. of Tamworth, N.S.W.	21.5	5.8	5.2	5.0	3.2	13.8

Coloration.—The present subspecies shows no important or noteworthy difference in pattern from *P. l. laminatus*, and in tone solely as here mentioned. All of the nine representatives now before me are in the brown phase except the female from 28 miles S. of Tamworth, which is in the extreme green phase, with the face, dorsum of the head, virtually all of the pronotum, and dorsal surface of the caudal femora green or yellowish green, with the abdomen ochraceous-buff, the usual dark lateral bars represented only by a fuscous lineation in the usual position of the dorsal border of the dark lateral bar, while the tegmina are clay colour to tawny-olive with the anal vein nearer cinnamon-buff.

²⁸² The cerci in the type are much less tapering distad than in the average of *l. laminatus*, but paratype males show that this is a variable feature in *l. actus* and hence cannot be given as of differential importance.

While the four brown phase females are virtually identical in their various pattern tones, the four males show a definite amount of variation, chiefly evident in the general tone of the dorsum of the head and pronotum. This ranges from as pale as buckthorn brown to as dark as prout's brown clouded with mummy brown (the type is of the latter phase). Whether the anal vein of the tegmina of the male is conspicuously pale and contrasted with the rest of the tegmina varies in the males, the contrast being most decided in one paratype, somewhat less marked in the type, and little evident in the others. In the females there is a similar but less marked range in the contrast of the tegminal anal vein, the allotype, in this respect, standing between the extremes.

Paratypes.—I regard as paratypes three males and two females from the type locality, with their other data the same as those of the type and allotype.

Remarks.—The present subspecies is the most northern form of the three entities which comprise the *laminatus* line of the genus. There is little question but that *l. actus* passes into *l. laminatus* in areas intervening between those in which the two subspecies are typically developed.

Distribution.—An area at or near the south foot of, and in the eastern section of, the Liverpool Range in central eastern New South Wales.

Specimens examined.—9; 4 ♂, 5 ♀.

New South Wales.—Coolah to Cassilis; Nov. 1936 4 ♂, 3 ♀ (*type, allotype, and paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 5 miles SSW. of Coolah; 9.xii.1948 (K. H. L. and B. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 28 miles S. of Tamworth; 10.xii.1948 (P. Carne and E. Britton) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra).

PRAXIBULUS EXSCULPTUS²⁸³ n. sp.

Plate 18, Figs. 192-195; Plate 25, Fig. 318

A member of the *laminatus* complex, exhibiting the least development of the proximal crest of the supra-anal plate of the male of any members of that assemblage, thus representing the opposite extreme from *P. duplex*, which is here placed at the other end of the complex. The nearest approach to *exsculptus* is shown by *P. laminatus actus*, but the break between this and *exsculptus* appears sufficiently important to regard them as members of different specific entities. Further there is no definite evidence now available of their intergradation.

From *l. actus* the present species is separable in the male sex, the sole one known of *l. actus*, by the even lower proximal crest of the supra-anal plate, which is transversely linear and, although divided into three sections, is without any median elevated production, the cerci are somewhat deeper in their proximal portion and less regularly attenuate, while the subgenital plate is slightly less blunted at the apex. The frontal costa is, as a whole, more extensively sulcate

²⁸³ i.e. *chiselled out*, in allusion to the reduced development of the proximal crest of the male supra-anal plate.

than in *P. l. actus*, and its lateral borders are subparallel ventrad of the inter-antennal region, instead of diverging ventrad to the axis of the median ocellus, and their margins are also more evident ventrad than in *l. actus*.

Type.—♂; Hunter Springs Station, Scone District,²⁸⁴ N.S.W. January 1953 (H. Cobb) (Division of Entomology Museum, C.S.I.R.O., Canberra).

General form and character of surface sculpture essentially as in *P. l. laminatus*.

Head with its exposed dorsal length appreciably less than the greatest breadth across the eyes (as 53 to 65), profile of the dorsum of the head as in *l. laminatus*; fastigium as seen from the dorsum with its length cephalad of the eyes but half the greatest fastigial breadth (as 11 to 22), outline faintly more produced than in the average of *l. laminatus* males, surface of disk of fastigium impressed as in *l. laminatus*; fastigio-facial angle and profile of face as in *l. laminatus*; frontal costa with its sulcation well impressed and more marked ventrad of the median ocellus than in *l. laminatus*, lateral margins moderately diverging from the fastigio-facial angle to the interantennal area, thence ventrad subparallel and somewhat more marked in that direction than in *l. laminatus*, impressed puncta of the sulcation moderately evident, there moderately biseriate in disposition dorsad. Eyes in prominence and in basal outline as in *l. laminatus*. Antennae equal to 1.3 times the length of the pronotal dorsum.

Pronotum with its dorsum about 1.25 times as long as the exposed dorsal surface of the head, greatest caudal width of the pronotal dorsum equal to seven-tenths the length of the same (as 47 to 67), greatest breadth caudad across lateral lobes subequal to the pronotal length (as 65 to 67), disk with its form as in *l. laminatus*, the cephalic and caudal margins similar in shape, the least breadth of disk, which is briefly in advance of the first transverse sulcus, approximately seven-tenths the greatest breadth of the same caudad (as 34 to 47); median and lateral carinae of the disk as marked as in *l. laminatus*, the transverse sulci and the sculpture of the discal surface as in the same, proportions of prozona and metazona virtually as in *l. laminatus*; lateral lobes slightly shallower in proportion to their length, the latter dorsad at the lateral carinae of the disk nearly equal to 1.5 times the greatest depth of the lobes (as 60 to 42), shape of margins as in *l. laminatus*, the impression of the sulci on the lobes similar to what is seen in the latter form except that the principal one is more evident ventrad.

Tegmina equal in length to the pronotal dorsum,²⁸⁵ their apices reaching to the middle of the second abdominal tergite, greatest breadth of tegmen as viewed in dorso-lateral aspect equal to half the tegminal length (as 33 to 67); costal and sutural margins slightly less arcuate than in the male of *l. laminatus*, longitudinal

²⁸⁴ Dr. Key advises me that this locality is "a sheep station in the Scone district". The altitude is given as approximately 4000 ft.

²⁸⁵ As the accompanying measurements show, the tegmina are usually somewhat shorter than the pronotal disk, but in the type they are equal in length. As the measurements also show, the ratio in the male sex ranges from equal (in the type only) to as small as seven-tenths the discal length.

venational elements as a whole even more sharply marked than in the latter, transverse convexity of the tegmina essentially as in *l. laminatus*.

Abdomen in general character as in *l. laminatus*; ultimate tergite without furcula; supra-anal plate with its more discal scutellar section having the characteristic pattern of welt-like ridges less extensive proximad, as a whole more distal in general position, proximal crest less extensive laterad than in the forms of *laminatus* and consisting of a relatively low transverse ridge partially divided into three lobule-like sections, the more lateral somewhat longer transversely than the central one, which, however, is in no way elevated into the type of median production seen in nearly all the other forms of the genus (all except *P. insolens*); cerci somewhat shorter than in *l. laminatus*, proportionately somewhat deeper proximad and with their attenuation as seen in profile less regular and not as even, the distal extremity more sharply aciculate than in *l. laminatus*; subgenital plate slightly less blunted and rather sharper at the apex than in *P. laminatus*.

Prosternal process transversely trigonal, moderately acute in outline, more so than in *l. laminatus*. Mesosternal interspace much as in *l. laminatus*, mesosternal lobes similar except that the caudal margin is more transverse truncate; mesosternal lobes as in *l. laminatus*.

Cephalic and median femora as long but distinctly more slender and less inflated than in *l. laminatus*. Caudal femora with their apices surpassing the apex of the abdomen by a distance approximately equal to half the pronotal length, in form much as in *l. laminatus* but the pregenicular section is slightly more tapering, their greatest depth (at proximal fifth) contained four times in their length (as 15.5 to 62), the least pregenicular constriction equal to but slightly more than one-third of the greatest femoral depth (as 5.5 to 15.5), sculpture as in *P. l. laminatus*; caudal tibiae somewhat shorter than the femora, margins each with 9 or 10 spines.²⁸⁶

Allotype.—♀; same data as type (Division of Entomology Museum, C.S.I.R.O., Canberra).

Differing from the description of the female sex of *P. l. laminatus* in the following noteworthy respects:

Form as a whole somewhat shorter and a little stouter than in *l. laminatus*; surface sculpture essentially as in *l. laminatus*.

Head with the outline of the fastigium as seen from the dorsum slightly less produced cephalad of the eyes and as a whole more broadly rounded than in the female of *l. laminatus*, fastigial disk as in *l. laminatus*, but median carinula obsolete on the occiput, interspace between the eyes subequal to virtually four-fifths of the greatest fastigial breadth (as 27 to 35); frontal costa of the type found in *l. laminatus* but subequal in breadth ventrad of the interantennal region, surface of costa appreciably but not deeply sulcate from the same point

²⁸⁶ The type has 9 externals on one caudal tibia, 10 on the other. The same individual lacks the external distal spine on one limb, but this is present on the other, which is the usual condition.

ventrad, sub-biseriately impresso-punctate dorsad of that point. Eyes in outline as in female of *P. l. laminatus*. Antennae slightly longer than the pronotal disk.

Pronotum much as in female of *P. l. laminatus*, the dorsal length of its disk equal to 1.75 times the exposed dorsal length of the head (as 32 to 18), greatest breadth of pronotal dorsum caudad, as in *P. l. laminatus*, subequal to the pronotal length, greatest breadth caudad across lateral lobes but faintly greater than the pronotal length (as 34 to 32), the disk regularly broadening caudad, the distinct lateral carinae in the allotype faintly outbowed,²⁸⁷ discal width at caudal margin 1.5 times that at the cephalic margin (as 30 to 20); cephalic margin of disk well arcuate, caudal margin of same very low arcuate with a shallow median emargination; median carina slightly less marked than in the female of *l. laminatus*, lateral carinae of the disk slightly more marked on the metazona than in the same sex of *l. laminatus*, transverse sulci and proportions of prozona and metazona as in latter; lateral lobes essentially as in *l. laminatus*.

Tegmina in proportions and character essentially as in the female of *l. laminatus*.

Abdomen in general form as in *l. laminatus*; supra-anal plate less sharply acute distad than in *l. laminatus*, a rather broad medio-longitudinal impression is indicated to the base,²⁸⁸ in transverse section the plate as a whole is arcuate, the transverse impression well marked mesad; cerci tapering but somewhat stouter and blunter than in the female of *l. laminatus*; dorsal ovipositor valves as seen from the dorsum shorter and stouter than in the female of *l. laminatus*, ventral valves as seen from the venter essentially as in *l. laminatus*; subgenital plate with its ventral margin, except for the intervalvar stylate process, as a whole much more transverse subtruncate than in *l. laminatus*, surface of the plate distad broadly rounding laterad into the vertical areas of the surface without any lateral fold or carina as is usual in *l. laminatus*.

Prosternal process lamellate, subtrigonally rounded in outline, broader and lower than in the male sex. Mesosternal interspace as in *l. laminatus* female, mesosternal lobes separated as in the same.

Cephalic and median femora as in the female of *l. laminatus*. Caudal femora in proportions and sculptural pattern as in the female of *l. laminatus*; caudal tibiae as in male of this species.

Coloration.—Both the green and brown colour phases are present in the female sex in the series of this species before me, but none of the limited series of males in any way approach the green phase and all of them would be regarded as brown phase individuals. Four females, of the 17 adults of that sex in the studied series, are definitely in the green phase, although several others show greenish areas on the genae, the lateral lobes of the pronotum, or the proximal section of the dorso-external face of the caudal femora. The

²⁸⁷ In paratype females from the type locality these may be straight diverging caudad, or even divergent but inbowed.

²⁸⁸ This varies in depth and definition in the paratypic series, but in the whole it is definitely present, but sometimes broken mesad.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂, 10-13 miles N. of Guyra, N.S.W., <i>paratype</i>	14.2	4.8	3.4	2.4	10.1
♂, Coryah Gap, Nandewar Range, N.S.W., <i>paratype</i>	14.1	5.0	3.4	3.0	10.9
♂, Coryah Gap, Nandewar Range, N.S.W., <i>paratype</i>	15.0	4.7	3.7	3.3	11.0
♂, Hunter Springs Station, N.S.W., <i>type</i>	14.8	5.0	3.7	3.7	10.5
♂, Hunter Springs Station, N.S.W., <i>paratype</i>	15.5	5.3	4.0	3.0	12.0
♂, C. 2 miles SE. of Wharton's Mill, Barrington Tops, N.S.W., <i>paratype</i>	15.5	— ²⁸⁹	3.5	3.2	11.0
♀, 12 miles SW. of Rocky Creek, N.S.W., <i>paratype</i>	17.0	— ²⁸⁹	4.5	3.7	11.3
♀, Hunter Springs Station, N.S.W., <i>paratype</i>	17.5	5.5	4.5	3.2	12.7
♀, Hunter Springs Station, N.S.W., <i>allotype</i>	17.0 ²⁹⁰	5.8	5.3	3.7	15.3
♀, Hunter Springs Station, N.S.W., <i>paratype</i>	18.5	5.8	5.7	4.5	15.4

single female from 12 miles SW. of Rocky Creek is in the most extreme green phase, equalled by another from the type locality (Hunter Springs Station), the series of that sex from the latter point covering the full colour range to the relatively uniform brown phase.

In the extreme green phase the distribution of that colour is essentially as in the same phase of *I. laminatus*, with the fuscous post-ocular bars on the head and lateral lobes of the pronotum darker, more solid, and more definitely contrasted with the green tone. In the female green phase individuals which show a tendency toward the brown phase the dorsum of the head and pronotum are washed with ferruginous, although the lateral green areas are not involved. The extreme brown phase females are essentially replicas of the same phase in *I. laminatus* and reference is made to the description of the coloration of the female of that subspecies, the sole noteworthy difference being that the general dark tone of the dorsum is deeper, rather nearer prout's brown, although the caudal femora are somewhat lighter in base colour, nearer tawny. The brown phase males have the dorsal surface of the head, pronotum, and much of the dorsum of the abdomen heavily infuscate, in the most extreme condition nearly as dark as mummy brown, the post-ocular bar being definitely and contrastingly mummy brown, as well as the ventral portion of the lateral lobes of the pronotum, and all of the pleura except the usual pale lines, which are cream

²⁸⁹ Incomplete.

²⁹⁰ Abdomen considerably retracted.

colour, and all of the tegmina except the anal vein, which may be virtually concolorous or contrastingly pale, even as pale as milky white. The pale longitudinal bar on the middle of the lateral lobes is light yellow green to mustard yellow, while the ventral surface of the abdomen, and the same area and much of the proximal external surface of the caudal femora are of the same tone. The face ranges from creamy white through pale tawny to lead colour, the sternum from pale buff to ochraceous-tawny. The dorsum of the abdomen has a medio-longitudinal uniformly wide bar of drab to smoke gray, which may be little evident or reasonably contrasted. The proximal crest of the male supra-anal plate and the more distal pattern of the surface of the same are always pencilled with blackish. The distal section of the caudal femora is appreciably washed with rufous, which in the male from near Wharton's Mill is darkened to russet. The sole male from the last mentioned locality, in the Barrington Tops, is the most infusate male seen, and some of the usually evident paler markings are here almost lost in the general "saturation" of the coloration. The male type has the most contrasted kind of male brown colour pattern, while the female allotype is in the full green phase of that sex.

Paratypes.—I am designating as paratypes all the adult material of the species which I have examined in addition to the type and allotype. These are two males from 10-13 miles N. of Guyra, N.S.W. (March 1941; K. H. L. Key); three males from Coryah Gap, Nandewar Range, N.S.W. (April 6, 1951; Key and Chinnick); one female from 12 miles SW. of Rocky Creek, near Bingara, N.S.W. (December 15, 1948; K. H. L. and B. Key); three males and 15 females from Hunter Springs Station, Scone district, N.S.W. (January 1953; H. Cobb); one male from about 2 miles SE. of Wharton's Mill, Barrington Tops, N.S.W. (April 10, 1949; T. G. Campbell).

Distribution.—This well-marked member of the *laminatus* stock of the genus is apparently restricted to certain sections of the elevated districts of north-eastern New South Wales, these including localities in the New England Plateau, the Nandewar Range, the slopes of the Liverpool Range, and Barrington Tops in the Mt. Royal Range. The most northern point from which I have seen it is 10-13 miles N. of Guyra, the most western Coryah Gap in the Nandewars, the most southern Hunter Springs Station in the Scone district and near Wharton's Mill in the Barrington Tops. The quite different *P. triangularis* and *P. nexilis* occur in the same general region.

Specimens examined.—29; 10 ♂, 17 ♀, 2 juv. ♀.

New South Wales.—10-13 miles N. of Guyra;²⁹¹ Mar. 1941; (K. H. L. Key); 2 ♂ (*paratypes*); (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Coryah Gap, Nandewar Range; 6.iv.1951 (Key and Chinnick) 3 ♂ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 12 miles SW. of Rocky Creek,²⁹² near Bingara; 15.xii.1948 (K. H. L. and B. Key)

²⁹¹ See Vol. II, p. 39, footnote 70.

²⁹² "Rocky Creek is a point 21 miles SW. of Bingara." (Information from Dr. Key, November 1953.)

1 ♀ (*paratype*) (Division of Entomology Museum, C.S.I.R.O., Canberra). Hunter Springs Station, Scone district; Jan. 1953 (H. Cobb) 4 ♂, 16 ♀ (*type, allotype, and paratypes*), 2 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). C. 2 miles SE. of Wharton's Mill, Barrington Tops;²⁹³ 10.iv.1949 (T. G. Campbell) 1 ♀ (*paratype*) (Division of Entomology Museum, C.S.I.R.O., Canberra).

PRAXIBULUS TRIANGULARIS²⁹⁴ n. sp.

Plate 15, Figs. 174-176; Plate 16, Fig. 177; Plate 24, Figs. 286-293

The present species, in its typical condition, can be recognized at once in the male sex by the sharply triangular form of the erect proximal crest of the supra-anal plate, which is not approached in any other species. The subgenital plate of the male is broadly rounded in outline as seen from the dorsum, and the margin of the same which is apical is more or less appreciably, and always shallowly, emarginate. The female sex has the distal margin of its subgenital plate shallowly and broadly concave-emarginate, with the ventral surface of the plate shallowly concave meso-distad, while that of the more lateral portions of the same general area are bullately rounded dorsad with no true longitudinal carinulae or folds.

Type.—♂: c. 1 mile N. of Polblue,²⁹⁵ Barrington Tops, N.S.W. April 7, 1949 (E. F. Riek) (Division of Entomology Museum, C.S.I.R.O., Canberra).

Size average (for the genus); form relatively stout, in some respects much resembling that of *P. exsculptus* but pronotal dorsum broader and thus approaching that of *P. galeritus*; sculpture essentially as in the forms of *laminatus*.

Head relatively thick and heavy for males of this genus, the width across the genae faintly greater than the mid-pronotal breadth and subequal to that across the eyes, not at all pyramidal in general outline as seen from the dorsum, profile of occiput very low arcuate but the outline is appreciably decurving cephalad to the but weakly marked and well-rounded fastigio-facial angle; fastigium as seen from the dorsum broadly rounded rectangulate in outline, only the more proximal lateral portions straight oblique, its length cephalad of the eyes but four-tenths of its greatest proximal breadth (as 9 to 22), surface of fastigial disk with the impression but moderately marked, semi-elliptical in outline, the same area proportionately no longer than the fastigial length and obsolete caudad of the mid-interocular space, bearing a fine medio-longitudinal carinula, which is subobsolete on the occiput, least interocular space in breadth

²⁹³ Wharton's Mill is "8 miles N. of Polblue". (Information from Dr. Key, March 1953.) For Polblue, see footnote 295.

²⁹⁴ In allusion to the shape of the proximal crest of the dorsal surface of the male supra-anal plate.

²⁹⁵ "Polblue is a high point (4944 ft) in the elevated country lying between Scone and Gloucester, being 30 miles slightly north of west of Gloucester. Barrington Tops is the name given to the high plateau from the vicinity of Polblue south to Carey's Peak (5125 ft)." (Information supplied by Dr. Key, March 1953.)

equal to eight-elevenths of the greatest fastigial breadth; frontal costa broad, the lateral margins evenly diverging ventrad to the level of the median ocellus, thence to the supra-clypeal sulcus its borders are poorly defined, surface of costa shallowly impressed about the median ocellus and thence dorsad, not truly sulcate. Eyes with their prominence as seen from the dorsum as in *P. l. laminatus*, basal outline as in same. Antennae slightly more than 1.3 times the length of the pronotal dorsum (as 31 to 23).

Pronotum relatively short and stout, very faintly substrangulate as seen from the dorsum, the disk somewhat narrowing at the first transverse sulcus, length of disk 1.15 times the greatest caudal breadth of the pronotum across the lateral lobes (as 23 to 20); cephalic margin of disk low arcuate, caudal margin arcuato-truncate, disk surface slightly more clepsydral than in *galeritus*, lateral carinae with their degree of development much as in *galeritus*, their divergence caudad of the least breadth of the disk (at first transverse sulcus) subsinuate and not as straight as in *galeritus*; median carina marked and well elevated,²⁹⁶ intersected by all three transverse sulci, but less clearly so by the first and second than is the case with the third (principal); prozona of disk nearly twice as long as the metazona of the same (as 46 to 25); surface of metazonal disk and of the cephalic section of the prozona rather densely and cribrosely impresso-punctulate, much more finely sculptured than in *galeritus*, the remainder of the prozonal disk coarsely and shallowly scrobiculate, more definitely etched than the sculpture of the same area in *P. galeritus*; lateral lobes less longitudinal in general proportions than in most species of the genus, the greatest median depth being equal to but seven-ninths of their dorsal length at the lateral carinae of the disk (as 49 to 64), their outline much as usual in the male of the genus except that the ventro-cephalic angle is distinctly obtuse-angulate, the ventral margin cephalad weakly but distinctly concave, and the caudal margin shallowly but appreciably concave, cephalic intra-marginal and second transverse sulci deeply impressed, the latter virtually straight. Metanotum with a marked medio-longitudinal tectation and carination much as in *P. galeritus*, but this is much less developed on the mesonotum than in *galeritus*.

Tegmina reaching to base of second abdominal tergite, general outline much as in the male of *P. galeritus*, the greatest tegminal breadth contained approximately twice in the tegminal length (as 12 to 23), in cross section the whole being as conchate as in *galeritus*; curvature of the margins as in the male of *P. galeritus* except that the costal margin is more broadly and regularly arcuate; venation much resembling that of *galeritus* but with the anal vein more emphasized and more elevated than any other, one axillary nervure relatively well marked.

Abdomen with the degree of recurvature of the apex and the extent and character of the medio-longitudinal carination of the dorsum as in *P. galeritus*;

²⁹⁶ The cephalic section of this carina in the type is, for some reason, less marked than the remainder, and in this respect that individual differs from the other males of the species now before me. Probably some early, now non-evident, injury may have been responsible for the condition found in the type.

ultimate tergite as in related species; supra-anal plate with its proximal crest developed into a median transversely trigonal production, which occupies the entire middle of the crestal ridge and is flanked laterad by obtuse-angulate shoulders, the proximal section of the cephalic surface with a shallow rounded pit-like depression, dorsal surface of plate distad of the proximal crest with the scutellar strumae of the basic type found in the male sex of the genus, i.e. paired median ones converging distad and more trigonal lateral marginal ones; cerci as in the male of *P. galeritus*, in length subequal to the lateral sections of the dorsal margin of the subgenital plate; subgenital plate relatively broad, poculiform, as seen from the dorsum with the lateral sections of the dorsal margin moderately arcuate, and evenly converging to the blunt distal section of the same, which is shallowly and faintly emarginate, not at all produced as in *galeritus*, in profile the ventral and caudal outline is evenly and continuously arcuate, profile of the dorsal margin straight except immediately distad.

Prosternal process essentially as in the male of *nexilis* and *galeritus*; mesosternal interspace narrow, elongate rectangulate, its greatest breadth but two-fifths of its length (as 6 to 16), lateral borders but moderately concave; mesosternal lobes distinctly transverse, their greatest breadth equal to 1.3 times their depth (as 21 to 16), meso-caudal angle narrowly rounded; metasternal lobes very briefly contiguous caudad of the foveolae.

Cephalic and median limbs as in *galeritus*. Caudal femora slightly more slender than in *galeritus*, their greatest depth contained 4.1 times in their length (as 48 to 198), longitudinal carinae as marked but narrower than in *galeritus*, as seen from the dorsum the femora are slightly more compressed; caudal tibiae but slightly shorter than the femora (as 29 to 31), with 9 external and 8-9 internal spines.

Allotype.—♀; 3 miles ESE. of Wharton's Mill,²⁹⁷ Barrington Tops, N.S.W. April 8, 1948 (E. F. Riek) (Division of Entomology Museum, C.S.I.R.O., Canberra).

Differing from the preceding description of the male, and also from the female sex of *galeritus*, in the following noteworthy respects.

Size for the sex rather larger than average (of the genus); form robust, more so than in *galeritus* or most of the members of the genus, the pronotum much splayed caudad.

Head with the breadth across the eyes equal to not quite nine-tenths that across the head caudad (as 26 to 29), the eye outlines as seen from the dorsum slightly more evenly low convex than in the female of *galeritus*; fastigium in outline with its apex but faintly more rectangulate than in the female of *galeritus*, impression of the fastigial disk distinct but very shallow, appreciably divided medio-longitudinally by a very low carinula; fastigio-facial angle more broadly rounded as seen in profile than in the female of *galeritus*, facial line less

²⁹⁷ Eight miles N. of Polblue, which see (footnotes 293 and 295). (Information from Dr. Key, 1953.)

retreating than in the female of *galeritus* and somewhat more convex; frontal costa very broad, the width at the median ocellus equal to three-fourths of the least interocular space, lateral margins of costa nearly subparallel, but faintly diverging ventrad and relatively evident ventrad to the supra-clypeal suture, surface of frontal costa but shallowly impressed about the median ocellus, elsewhere relatively plane with scattered impresso-punctations, as is much of the remainder of the face. Eyes in basal outline quite broad, their depth hardly more than 1.2 times their greatest breadth (as 45 to 37), entire caudal outline from dorso-cephalic angle to ventro-cephalic one more rounded, strongly and regularly arcuate, cephalic margin nearly straight. Antennae 1.1 times as long as the pronotal dorsum.

Pronotum very short and broad, its greatest breadth caudad across the lateral lobes equal to 1.14 times its greatest median length (as 39 to 34); cephalic margin of disk low arcuate, caudal margin of same subobtusely rounded, the median section subtruncate; median carina well marked and continuously developed, with the transverse sulci finely intersecting but not truly dividing it; lateral carinae of disk well marked, straight, evenly diverging caudad, tectation of disk in transverse section as distinct as, but somewhat lower than, in *P. galeritus*, surface of dorsum with its sculpture essentially as in *galeritus*; lateral lobes very slightly shorter and deeper than in the female of *galeritus*, the greatest median depth being contained 1.21 times in their greatest dorsal length at the lateral carinae of the disk (as 70 to 85), as against 1.27 in the female of *galeritus* (the ratio there being 63 to 80), ventral margin more strongly angulate mesad than in *galeritus*, surface of the immediately ventral section as a whole more impressed than in *galeritus*. Metanotum with median carina moderately developed, and with diminishing emphasis distad over the abdomen until it becomes obsolete on the antepenultimate abdominal tergite.

Tegmina attingent disto-mesad,²⁹⁸ reaching to distal portion of third abdominal tergite, very broad, the greatest width equal to eight-ninths of the tegminal length (as 24 to 27), costal margin broadly arcuate, but less so than in the female of *galeritus*, the distal two-thirds low arcuate to the rounded disto-costal angle, the distal margin broadly transverse subtruncate, the sutural margin distad arcuate to the more narrowly rounded disto-sutural angle; principal longitudinal venation much more strongly emphasized in relation to the subsidiary elements than in the female of *galeritus*, the subsidiary ones weaker and less regular and more involved in complex anastomosing areolation.

Abdomen with its dorsal surface less tectate than in the female of *galeritus*, the medio-longitudinal carination being on a somewhat more deplanate surface; supra-anal plate with its dorsal surface mesad more rounded transversely and rather less deplanate than in the same sex of *galeritus*; cerci essentially as in

²⁹⁸ These range in the series before me from definitely but not broadly overlapping, through attingent and subattingent to separated by an appreciable interspace. This latter condition, however, is not the usual one in the female sex, the majority showing overlapping or attingent tegmina.

the female of *galeritus*; ovipositor valves somewhat more robust and as a whole slightly less attenuate than in the female of *galeritus*, the apices, however, more extended than the more proximal sections, proximal tooth of ventral pair no more evident than in the female of *galeritus*; subgenital plate broad, its ventral surface roundly subdepressed medio-longitudinally in distal half, distal margin shallowly concave mesad, intervalvar style very slender and spiniform, no true surface carinae or folds are present ventro-laterad, but a distinct obtuse-angulation of the surface extends obliquely ventro-caudad, from a point near the ventro-caudal angle of the antepenultimate tergite to the distal margin beneath each ventral valve.

Prosternal process transverse lamellate, subtrapezoidal with angles and distal section of margin rounded, greatest depth of process contained somewhat more

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Length of Tegmen	Length of Caudal Femur
♂, C. 1 mile N. of Polblue, Barrington Tops, N.S.W., <i>type</i>	15.8	5.3	3.7	4.0	10.5
♂, C. 1 mile N. of Polblue, Barrington Tops, N.S.W., <i>paratype</i>	15.8	5.3	3.9	3.5	11.2
♂, Bean Bean Plains, Barrington Tops, N.S.W., <i>paratype</i>	15.5	4.4	3.5	2.9	11.0
♂, Bean Bean Plains, Barrington Tops, N.S.W., <i>paratype</i>	16.0	5.0	3.7	3.5	11.4
♂, C. 2 miles SE. of Wharton's Mill, Barrington Tops, N.S.W., <i>paratype</i>	14.0 ²⁹⁹	5.7	3.9	3.4	10.9
♂, 3 miles ESE. of Wharton's Mill, Barrington Tops, N.S.W., <i>paratype</i>	14.6 ²⁹⁹	5.7	3.9	3.5	11.7
♂, 1 mile ESE. of Hartley, N.S.W., <i>paratype</i>	14.8	5.3	3.9	3.7	10.5
♂, 1 mile ESE. of Hartley, N.S.W., <i>paratype</i>	14.9	5.8	3.5	3.4	10.9
♀, C. 1 mile N. of Polblue, Barrington Tops, N.S.W., <i>paratype</i>	17.5 ³⁰⁰	5.3	5.0	4.0	14.1
♀, C. 1 mile N. of Polblue, Barrington Tops, N.S.W., <i>paratype</i>	24.1	5.2	5.2	4.7	14.5
♀, Bean Bean Plains, Barrington Tops, N.S.W., <i>paratype</i>	18.0 ³⁰⁰	5.7	5.2	4.5	13.5
♀, C. 2 miles SE. of Wharton's Mill, Barrington Tops, N.S.W., <i>paratype</i>	18.2	5.3	4.8	4.0	13.3
♀, C. 2 miles SE. of Wharton's Mill, Barrington Tops, N.S.W., <i>paratype</i>	19.1	5.3	5.7	4.5	13.8
♀, 3 miles ESE. of Wharton's Mill, Barrington Tops, N.S.W., <i>paratype</i>	15.0 ³⁰⁰	4.8	4.4	3.2	12.7
♀, 3 miles ESE. of Wharton's Mill, Barrington Tops, N.S.W., <i>allotype</i>	20.0	6.1	5.5	4.4	14.3

²⁹⁹ Apex of abdomen more strongly recurved than in the majority of the sex before me.

³⁰⁰ Abdomen appreciably retracted or telescoped, hence body length somewhat less than usual.

than twice in its proximal breadth, lateral borders strongly inclined disto-mesad; mesosternal interspace distinctly transverse rectangulate, the breadth being slightly more than 1.5 times the depth of the interspace (as 20 to 13), mesosternal lobes transverse rectangulate, the breadth 1.5 times their depth (as 30 to 20), meso-caudal angle well marked, distal margin of lobes very low arcuate; metasternal lobes separated by a distance subequal to that between the foveolae.

Cephalic and median limbs as in the same sex of *galeritus* except that the femora are straighter, especially the median. Caudal femora in proportionate length as in the female of *galeritus*, but, as in the male sex, slightly more slender, the greatest depth contained four times in their length (as 21 to 85), paginal pattern somewhat more widely spaced than in *galeritus*; caudal tibiae in length equal to seventeen-twentieths of the femoral length (as 72 to 84), with 10 external and 9-10 internal spines.

The above measurements of extremes clearly present the comparatively broad range in size seen in the material of this species. This is basically individual, as witnessed by the two females from 3 miles ESE. of Wharton's Mill, which show the extremes in that sex for most of the dimensions of parts (not, however, of total length, which is a less reliable dimension, particularly in the female sex). The tegminal length, which is taken proximad to the articulation, shows an especially broad range in variation, and particularly in the female sex.

Coloration.—In this species we find the usual two colour phases present. The green phase, however, as is true of *P. galeritus*, is fully developed only in the female sex, the nearest approach in the male being but partial or relative, as is the case with that discussed under *P. galeritus*. This is seen only in a single male from 2 miles SE. of Wharton's Mill, while another from 1 mile ESE. of Hartley weakly suggests the same. The brown phase of the male is almost identical in pattern and tones with that of *P. galeritus*, with the range in tones very similar, except that the base brown is nearer olive-brown to bone brown and less bister. In the male sex the most marked pattern features are the rather sharply contrasted pale post-ocular line on the genae and mesad across the lateral lobes of the pronotum, which ranges in colour from pinkish buff and pinkish cinnamon to clear dull-green-yellow, and is sharply contrasted with a dark, more ventral, patch on the prozona of the lateral lobes, a pronounced oblique, usually light ochraceous-salmon, line on the metapleura, and generally a pinkish cinnamon lining of the tegminal anal vein. The pale area of the dorsum of the abdomen in the brown phase male ranges from pinkish cinnamon to sayal brown. In the single male mentioned above as approaching the green phase the paler parts of the lateral lobes of the pronotum, including most of the metazona of the same, are of the above-mentioned green yellow, which also tints the more proximal portion of the dorsal surfaces of the caudal femora, more weakly the ventral surfaces of the same and more solidly and vividly the ventral and lateral surfaces of the abdomen, except for the recurved distal portion, which is washed with pinkish cinnamon. In numerous males the central section of the paler lining of the lateral lobes of the pronotum is whitish or cream colour, and thus appreciably contrasted with the tone of those continuing

sections of the pale stripe cephalad and caudad of this portion. In the male sex the lace ranges in tone from as pale as flesh colour to as dark as fuscous, the antennae range from as pale as wood brown proximad becoming fuscous distad, to almost solidly fuscous, while the eyes range from clay colour to bistre. The cephalic and median limbs, and particularly the femora, are washed with cinnamon to snuff brown, the dorso-cephalic carina of the femoral surface often contrastingly lined with pinkish cinnamon, this usually in the most heavily infuscate individuals, while the ventro-external face of the caudal femora may be washed with brick red (this condition in the type), it may on the other hand be as mustard yellow as the ventro-internal one; caudal tibiae ranging from glaucous blue to very dull dark glaucous, the blackish patellar spot always marked, the spines bluish white, black tipped.

In the present material of the female sex all but two of the total of 14 are in the green phase, the two brown phase females being from the Bean Bean Plains and 2 miles SE. of Wharton's Mill. It would seem from this that the green phase may predominate in nature, but this cannot be assumed without broader and more conclusive evidence. The tones and pattern of the green phase in the females are essentially as in that phase of the female sex of *galeritus*, the only really obvious difference being that in *triangularis* the greens are rather duller and darker, usually nearer bice green. One green phase female from 2 miles SE. of Wharton's Mill has the dorsum of the head and pronotum russet, the remainder of the surface as in the more usual green phase females. The accompanying illustrations of the allotype present the usual pattern type of the green phase females. The above-mentioned brown phase females have their base tone ranging from cinnamon-brown to mars brown, with little in the way of body contrasts except for the pale lining of the lateral lobes of the pronotum and of the metapleura. Only in one green phase female from Bean Bean Plains is the anal area of the tegmina definitely paler and more distinctly green than the more olivaceous remainder of these organs, in which, however, the veins of the humeral trunk are similarly more strikingly green proximad. Usually there is little contrast between the anal area and the remainder of the tegmina, although one green phase female from 2 miles SE. of Wharton's Mill has the anal vein contrastingly buffy.

Paratypes.—All of the material examined from the three Barrington Tops localities, aside from the type and allotype, is regarded as paratypic, i.e. 3 ♂ and 2 ♀ from the type locality; 3 ♂ and 3 ♀ from Bean Bean Plains; 4 ♂ and 5 ♀ (one pair *in coitu*) from 3 miles ESE. of Wharton's Mill; and 2 ♂ and 4 ♀ (one pair *in coitu*) from c. 2 miles SE. of Wharton's Mill.

Distribution.—This species is at present known only from the southern portion of the New England Plateau in New South Wales, which is referred to as the Barrington Tops, and also from the Blue Mountains area near Hartley. It is quite possible it will be found to be much more broadly distributed in the higher elevations of east central New South Wales.

Remarks.—The most obvious feature of variation in this species is the contrast in robustness of individuals of the female sex. This is particularly evident in

those from 3 miles ESE. of Wharton's Mill, the extremes of which series are given in the preceding table of measurements.

The three males from Hartley, N.S.W., which are here referred to *triangularis* may eventually prove to represent a distinct entity, possibly a subspecies of *triangularis*. In them the prosternal process is narrow distad with its distal transverse margin obscurely bituberculate, as contrasted with the broader process with a proportionately broader and truncate apex of the more usual condition, while in the Hartley males also the proximal crest of the male supranal plate has its median process with much narrower (transversely) lateral shoulders and its general form is less truly trigonal, with weak but distinct preapical nibs or shoulders, while the actual apex is less sharply acute. Only additional material and further study will determine the character of these variations, i.e. whether they are purely individual variants or differential features of a recognizable geographic subspecies.

Specimens examined.—31; 17 ♂, 14 ♀.

New South Wales.—About 1 mile N. of Polblue,³⁰¹ Barrington Tops; 7.iv.1949 (E. F. Riek) 5 ♂, (*type* and *paratypes*) 2 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Bean Bean Plains, c. 3 miles S. of Polblue,³⁰¹ Barrington Tops; 10.iv.1949 (E. F. Riek) 3 ♂, 3 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). About 2 miles SE. of Wharton's Mill,³⁰² Barrington Tops; 9-10.iv.1949 (E. F. Riek) 2 ♂, 4 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 3 miles ESE. of Wharton's Mill, Barrington Tops; 8.iv.1949 (E. F. Riek) 4 ♂ (*paratypes*), 5 ♀ (*allotype* and *paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 1 mile ESE. of Hartley;³⁰³ 3.xii.1948 (K. H. L. and B. Key) 3 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia).

Genus KOSCIUSCOLA Sjöstedt

Kosciuscola Sjöstedt, 1933, Ark. Zool. 26A (9): 6; Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 61, 79.

Genotype (by monotypy) *K. tristis* Sjöstedt.

This genus is the most distinctively alpine of the members of the Acridoidea found in Australia, being found to the summit of Mt. Kosciusko, yet absent below approximately 4000 ft elevation, except in Tasmania, where under cooler conditions it reaches lower levels. Its range embraces the coldest portions of Australia and probably of Tasmania as well. Five very distinct species of the

³⁰¹ See footnote 295.

³⁰² See footnote 297.

³⁰³ On upper Cox River, about 12 miles (air-line) NW. of Katoomba. Position 33° 34' S., 150° 11' E.

genus are now known, one of these dividing into two subspecies, between which geographic intergrades are known.

Generic characters.—Form moderately slender in males, fusiform to subfusiform and relatively robust in females, brachypterous in both sexes. Head ranging from broad and relatively robust in the female of certain species to subconical in the males of others; fastigium of average production, in outline as seen from the dorsum ranging from subacute to obtuse-angulate, its disk shallowly excavate to virtually non-excavate, usually with a weak medio-longitudinal carinulation; fastigio-facial angle ranging from rounded obtuse to rounded rectangular; frontal costa relatively broad, narrowing dorsad, its lateral margins rounded and in no way carinate except in the male of *K. cuneatus*, surface ranging from appreciably sulcate in most of its length (in male of *cuneatus*) to non-sulcate except for a weak depression immediately about the median ocellus; lateral facial carinae of variable emphasis; antennae short to medium in length, composed of 19-21 articles, usually 19.³⁰⁴ Pronotum in female expanding appreciably caudad, usually substrangulate in male as seen from dorsum, disk in the male usually somewhat constricted on the prozona, thence moderately broadening caudad, in the female widening caudad over its whole length with a variable degree of regularity in the different species; cephalic margin of disk low arcuate to subtruncate in the male, subtruncate in the female, caudal margin shallowly emarginate mesad, the degree varying in the species; median carina of the pronotum well marked, lateral margins of the pronotal disk with coarsely marked carinae (female of *t. tristis*) or finely sculptured ones (males of other species); principal transverse sulcus the sole one which always severs the median carina, the others, of which the second and third (principal) cut the lateral shoulders, not intersecting the median carina except in the male of *cuneatus*, where the second does it more weakly than is true of the principal sulcus. Tegmina in length not exceeding that of the pronotum, position always lateral, sometimes shorter (particularly in the female of *tristis*), elliptically lobate, apex usually subacute, their longitudinal venational elements limited to distinct discoidal and anal veins, and more rarely an axillary one in the anal field, which is well cut off from the discoidal field by the anal field forming an angle between the two, surface of tegmina otherwise irregularly and rather finely cribroso-reticulate. Wings vestigial, completely hidden under the tegmina. Abdomen with an appreciable medio-dorsal carina, becoming subobsolete distad in certain species, surface of metanotum and at least the proximal abdominal tergite in several species (i.e. *cognatus* and *tasmanicus*) with moderately evident lateral subcarinulations paralleling the median one, these not indicated in other species. Ultimate abdominal tergite in male divided or notched mesad and supplied with distinct lobate furcula, these varying in outline and breadth in the different species; supra-anal plate of male ranging in outline from trigonal to broad scutellate, apex rectangular

³⁰⁴ Adventitious division of the distal or one of the other articles is chiefly responsible for this range in number.

to moderately acute-angulate, surface with a more or less strongly marked medio-longitudinal sulcus in proximal half, sculpture of remainder of surface varying specifically; cerci of male subconical, simple or with an internal subdentate process in distal half; subgenital plate subconical in the majority of the species, blunter, broader, and less definitely produced in the male of *cognatus*, the apex of the plate distinctly (*cuneatus*) or weakly rostrate in all of the species except in *cognatus*, in which the apex is relatively blunt; supra-anal plate of female trigonal or subtrigonal in outline, rather strongly arched over the intra-cercal plates, medio-proximal impression moderately evident; cerci of female short, simple, conical; dorsal ovipositor valves with external margins with or without distinct serrulations, valves varying specifically in the degree of their robustness and proportions, ventral ovipositor valves with the ventro-external margin having a proximal lobe developed to a greater or lesser degree; subgenital plate of female with its distal margin variously developed in the different species. Prosternal process developed either as a transversely lamellate structure with a marked trigonal outline (*tristis*) or of a much more broadly lamellate form and of subquadrate outline with the distal margin emarginate mesad to variable degrees (*cognatus*, *tasmaunicus*, and *usitatus*), or subcuneate in outline, narrowing distad and with apex sub-bilobate (*cuneatus*). Interspace between mesosternal lobes ranging in the male sex from distinctly longitudinal to moderately transverse, always narrower than one of the lobes; in the female ranging from quadrate (*cuneatus*) to strongly transverse and shallow (*t. tristis*); metasternal lobes subcontiguous in males, in females ranging from narrowly separated to as widely spaced as approximately half the interspace between the metasternal lobes (*t. tristis*). Cephalic and median femora moderately to rather strongly bullate in the male, in the female definitely more slender. Caudal femora moderately broad in profile, as seen from dorsum somewhat more so in the male than in the female, longitudinal carinae well marked, entire, genicular lobes rounded distad; caudal tibiae with apical spine present on external margin, external margin with 9-12, internal with 8-12 spines; tarsal claws equal, arolium well developed.

Epiphallic features.—The epiphallus of *Kosciuscola t. tristis*, the type of the genus (see Plate 25, Fig. 326), has a broad bridge, laterad of which the dorsal surface is transversely concave, rising toward the cephalic border, which bears the well-developed decurving and mesad-directed acute dentiform ancorae,³⁰⁵ which are separated from one another by a distance equal to half the total breadth of the epiphallus, while the lateral plates,³⁰⁵ on which they are placed, broadly round laterad into the lateral borders of the epiphallus. The lophi³⁰⁵ are strongly elevated dorsad, set at an angle of 45° to the transverse axis of the epiphallus, and bear two marked structures, the more dorsal a vertically somewhat flattened lobe, which in elevation is rounded in outline, the other, which is directed meso-cephalad, a depressed structure, of general horizontal disposition, broadening somewhat distad and with its distal outline, as seen from the dorsum,

³⁰⁵ See Roberts, Proc. Acad. Nat. Sci. Philad. 93: 218, Fig. 43 (1941).

moderately arcuate. Both of these developments of the lophi have their distal extremities finely shagreenous.

The presence of this accessory horizontal branch or arm on the lophi is an unusual feature, the sole case known to me which suggests what we find in *Kosciuscola* being the bifid branch of the lophi seen in the Chilean genus *Aucacris*,³⁰⁶ which has the same general slant and position as this basal branch, but is a double, instead of a single, structure. However, in other respects the epiphallus of *Aucacris* differs appreciably from what is seen in *Kosciuscola*, and in other features of their morphology the two genera are not at all closely related, although it is within the realm of possibility that they may have had a common, if remote, ancestry.

Possible role of parasitism in modification of male genitalia in certain species.—In material of the male sex of three species of the genus here studied, i.e. *cognatus*, *usitatus*, and *cuneatus*, a total of 10 specimens show marked evidence of incomplete development of the external genitalia. This is chiefly in the lack, or much reduced development, of the furcula, a much more simple and subtrigonal form and reduced or generalized surface sculpture of the supra-anal plate, relatively simple cerci, and similarly less evident differential features of the subgenital plate, which latter is more subconical and less specialized. Often these features are accompanied by a marked reduction in size of the tegmina. There is no external structural evidence of gynandromorphism in these specimens, and also without clear evidence of internal features to support such a conclusion I cannot regard them as intersexes. What we do see is a more simplified development of the external genitalia than in a normal male, probably through the influence of factors which have caused the retention of what is to a degree a preimagal type of structure. To me they exhibit the earmarks of parasitism in earlier instars, with the disturbing effect which that process has upon surviving individuals, particularly males. All except two of these cases, and those of *cognatus* from Charlotte Pass on Mt. Kosciusko, are from either the most northern or the most southern portion of the range of the species involved. Under the respective species concerned full data are given regarding these presumably parasitized males.

Experimental studies on colour response to temperature in the genus.—Quite recently Drs. K. H. L. Key and M. F. Day published several most interesting studies along these lines,³⁰⁷ centred chiefly on the species *tristis* (and subspecies *t. tristis* as here understood), but this investigation also involved to lesser degrees two of the species of the genus here described as new. Reference is made here under the respective species to the first of the Key and Day studies which touches

³⁰⁶ See the figure of the epiphallus of *Aucacris bullocki* Rehn, Proc. Acad. Nat. Sci. Philad. 95, Plate 10, Fig. 9 (1943).

³⁰⁷ "A temperature-controlled physiological colour response in the grasshopper *Kosciuscola tristis* Sjöst. (Orthoptera: Acrididae)." Aust. J. Zool. 2: 309-39, Text figs. 1 and 2, Plates 1 and 2 (1954).

"The physiological mechanism of colour change in the grasshopper *Kosciuscola tristis* Sjöst. (Orthoptera: Acrididae)." Aust. J. Zool. 2 (3): 310-63, Text figs. 1-7 (1954).

upon the species other than *tristis*, the latter alone being discussed in the second study.

These two contributions are of exceptional importance to those interested in animal physiology, if only for the basic and conclusive data which they supply on the role that temperature plays in influencing coloration in at least certain species of grasshoppers. As a possibility this idea has long been in the minds of some students of the Orthoptera who have had extensive field experience, but the present experimental studies by Key and Day, carried out both in the natural environment and in the laboratory, have given us specific information of convincing character, which should lead to similar work with other species occurring in different environments. Summaries of the detailed investigations set forth in the two papers are presented at the beginning of each of the studies, and the student is referred to these for a broader understanding of the results achieved.

Remarks.—Of the five species now known the genotypic one, i.e. *tristis*, and more definitely *t. tristis*, has the most circumscribed distribution, in its typical form being known only from the Mt. Kosciusko Massif. There are four lines of development in the genus: 1, the *tristis* line, with *tristis tristis* and *t. restrictus* n. subsp.; 2, the *cognatus* line, with *cognatus* n. sp. and *tasmanicus* n. sp.; 3, the *usitatus* line, consisting of *usitatus* n. sp.; and 4, the *cuneatus* line with *cuneatus* n. sp. We find three types of prosternal processes in the genus, and to some scholars the division of *Kosciuscola* into three generic, or subgeneric, entities on the basis of these differences would seem warranted. However, as similar differences are often found within the limits of other acridoid genera, and as synthesis is as important in classification as analysis, I prefer to regard them as separate lines of an otherwise cohesive genus, the members of which apparently have had a relatively similar history, this reflected today in their distribution and habitat preferences.

It is now evident that Sjöstedt in 1933 and 1935, in his discussions of *Kosciuscola*, confused two species, one (*cognatus*) here described as new. When the genus was originally described, and *K. tristis* (i.e. *K. t. tristis* as here understood) was erected, Sjöstedt had before him solely female material taken on Mt. Kosciusko by Fuller, without more exact data, and from the Canberra collection. Of this original material I have before me the here-designated lectotype belonging to Canberra.³⁰⁸ In 1935 Sjöstedt noted that he had also seen material—how much was not stated—which he referred to *tristis*, taken on Mt. Kosciusko, February 14, 1934, by Tonnoir, and apparently received from the Canberra series. No male material with this data is now in the Canberra collection, to which ethically the first male of the series reported should have been returned, although female specimens bearing the same data, from the Canberra series, which had been examined by Sjöstedt, are now before me, and these clearly do not represent *tristis*, but belong instead to the here-described *K. cognatus*.³⁰⁹

³⁰⁸ For details see discussion under *K. t. tristis*.

³⁰⁹ For more details see comments under *K. cognatus*.

In his 1935 paper Sjöstedt gave no description or critical comments on the male then reported, other than a few colour comments which, in view of what we now know of coloration in this genus, have no identifying value, and measurements which are equally unconvincing. In view of the fact that the material studied by Sjöstedt, and now before me, represents two very different species, I do not regard Sjöstedt's mere reference of male material to *tristis*, without supporting information, as constituting an allotypic designation for *tristis*, particularly as we know that females bearing the same exact data, and which he determined as *tristis*, are not that species. As four species of the genus occur on Mt. Kosciusko, it is quite within the realm of possibility that any one of the four might be involved, and there is nothing in Sjöstedt's 1935 note which either describes the male reported as present, or would indicate with any clarity to which species it might belong. Beyond question females bearing the same data, and determined by Sjöstedt as *tristis*, are *cognatus*. It is logical to assume that the male (or males) then before Sjöstedt was probably specifically identical with the females bearing the same data, and thus more than likely representing *cognatus*. As no male description was ever given by Sjöstedt, what male material he had must remain undetermined. However, this in no way affects the specific conclusions or the use of names here presented.

Distribution.—The montane, and alpine, areas of south-eastern Australia, and the higher levels of Tasmania, encompass the range of the genus *Kosciuscola*. The most northern points of its distribution are the higher peaks of the Australian Capital Territory, and from there it is found southward and south-westward over the Kosciusko Massif, to the Mt. Hotham, Mt. Feathertop, and Mt. Buffalo areas of north-eastern Victoria. A single species (*K. cognatus*) is also known to extend into the Gourock Range, east of the Kosciusko Massif, across the Monaro uplands, probably as a relict of a former broader distribution. In Tasmania the endemic species (*K. tasmanicus*) is known only from the more elevated central area.

Altitudinally the genus is predominantly alpine, reaching to the highest elevation in Australia, the summit of Mt. Kosciusko at 7328 ft. On the Australian mainland its lower level of distribution is at approximately 4000 ft, while in Tasmania elevations between 2000 and 3300 ft are frequented by the single species occurring there.

KEY TO SPECIES AND SUBSPECIES OF KOSCIUSCOLA

1. Prosternal spine subacute, trigonal in outline. Frontal costa markedly sulcate in both sexes ventrad of median ocellus. (Caudal femora not black tipped.) 2
- Prosternal spine not acute nor trigonal, developed as a compressed lamella of several types of outlines. Frontal costa non-sulcate, or but moderately and very incompletely so, never markedly as in alternate 3
2. Form more robust (both sexes), broader. Head in both sexes heavier and more inflated across the genae; fastigium as seen from dorsum broader,

with its outline more broadly obtuse-angulate. Facial line less strongly retreating; fastigio-facial juncture, as seen in profile, with its arcuation more broadly rounded in both sexes. Pronotum as seen from the dorsum proportionately shorter and broader, particularly in the female. Tegmina proportionately shorter and broader. Cephalic and median femora of male more strongly inflated. (Kosciusko Massif, N.S.W., and intermediate between *t. tristis* and *t. restrictus* in main Victorian highlands.)

tristis tristis Sjöstedt

Form less robust (both sexes), more slender. Head in both sexes not as broad nor as heavy, less inflated across the genae; fastigium as seen from dorsum narrower, with its outline less broadly obtuse-angulate. Facial line more strongly retreating, straighter; fastigio-facial juncture, as seen in profile, with its arcuation more narrowly rounded, particularly in the female. Pronotum as seen from the dorsum proportionately longer and narrower in both sexes. Tegmina proportionately somewhat longer and narrower. Cephalic and median femora of male much less strongly inflated. (Mt. Buffalo, Vic.)

tristis restrictus n. subsp.

3. Prosternal process subquadrate in outline, its transverse distal margin often (and usually) shallowly obtuse-emarginate. Head more conical as seen from dorsum; frontal costa not sulcate, or at most weakly so and solely about median ocellus; fastigium as seen from dorsum rectangulate in general outline. Median carina of dorsum of pronotum coarser in sculpture, particularly in the female. Tegmina generally less strongly bicoloured, with anal area narrower. Proximal abdominal tergites and metanotum with accessory, but less pronounced and lower, lateral carinae paralleling the median one (subobsolete in *K. usitatus*). Furcula of male ultimate abdominal tergite smaller and variously developed

Prosternal process cuneiform in outline, narrowing distad, its apex usually briefly divided or even fissate. Head less conical as seen from dorsum; frontal costa moderately and incompletely, but definitely, sulcate; fastigium as seen from dorsum obtuse-angulate in general outline. Median carina of dorsum of pronotum more finely marked. Tegmina quite strongly bicoloured, with anal area broader. Proximal abdominal tergites and metanotum with no definite sculpture except the median carina. Furcula of male ultimate abdominal tergite relatively marked, its lobes very broad and rounded. (Caudal femora blackish at apices.) (Mountains of Australian Capital Territory, of adjacent New South Wales, and eastern Victoria.)

cuneatus n. sp.

4. Form somewhat more robust, less attenuate; head less pyramidal as seen from dorsum. Furcula of male with lobes developed as broad, shallow, and obliquely docked structures, subattingent mesad; surface of supra-anal plate of male with distinct paired supplementary lateral carinate ridges; cerci of male with extremity distad of internal tooth longer and aciculate. Ventral ovipositor valves of female with proximo-lateral tooth of external margin of ventral surface strongly marked as a peg-like structure. No

post-ocular pale bar on head. (Genicular area of caudal femora not blackish.) (Mountains of Australian Capital Territory, southern New South Wales, and eastern Victoria.) *nsitatns* n. sp.

Form somewhat less robust, more attenuate; head more pyramidical as seen from dorsum. Furcula of male with lobes rounded and moderately separated mesad; surface of supra-anal plate of male without paired supplementary lateral carinate ridges; cerci of male with extremity distad of internal tooth very short. Ventral ovipositor valves of female with proximo-lateral tooth of external margin of ventral surface but moderately developed, not a peg-like structure. Pale post-ocular bar on head 5

5. Pronotum of female with form as usual in females of the genus, as a whole less bullate latero-caudad. Supra-anal plate of male broader, more pentagonal in outline. Subgenital plate of female with distal margin lacking definite acuminate lateral processes. Caudal femora with genicular extremity and tibial base more or less completely blackish. Caudal tibiae as a whole glaucous. (Mountains of Australian Capital Territory, south to those of south-east New South Wales.) *cognatus* n. sp.

Pronotum of female increasingly bullate latero-caudad. Supra-anal plate of male more subtrigonal in outline. Subgenital plate of female with distal margin bearing definite acuminate lateral processes. Caudal femora without blackish on genicular extremity, nor on tibial base. Caudal tibiae as a whole more brownish purplish, or olivaceous, never truly glaucous. (Elevated central Tasmania.) *tasmanicus* n. sp.

KOSCIUSCOLA TRISTIS Sjöstedt

This species, like other mainland members of the genus, occurs only in the more elevated portions of the mountains of Victoria and extreme southern New South Wales, ranging from the Mt. Buffalo, Mt. Feathertop, and Mt. Hotham areas north-eastward to the Kosciusko Massif. It is divisible into two subspecies, i.e. *K. t. tristis*, which typically inhabits the higher levels of the Kosciusko Massif, and *K. t. restrictus*, which apparently is typical only in the relatively isolated Mt. Buffalo Plateau of Victoria, while the representation of the species from Mt. Hotham, Mt. Feathertop, and similar areas of the main Victorian highlands is intermediate between *K. t. tristis* and *K. t. restrictus*.

KOSCIUSCOLA TRISTIS TRISTIS Sjöstedt

Plate 18, Figs. 196 and 197; Plate 19, Fig. 198; Plate 20, Fig. 206; Plate 25, Figs. 319-335

Kosciuscola tristis Sjöstedt, 1933, Ark. Zool. 26A (9): 6, Plate 1, Fig. 3 (♀; Mt. Kosciusko [New South Wales¹⁰]); Sjöstedt, 1935, (Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 79 (in part, Fuller material only, Mt. Kosciusko, N.S.W.); Key and Dav, 1951, Aust. J. Zool. 2: 309, 311, Plate 1, Figs. 1 and 2 (♂, ♀; Kosciusko Massif, N.S.W.).

¹⁰ This is erroneously given in the original description as "F[ederal] C[ommonwealth] T[erritory]" (= A.C.T.).

Typical *K. t. tristis*

New South Wales.—Mt. Kosciusko; Feb. 1928 (M. Fuller) 1 ♀ (*type*) (Division of Entomology Museum, C.S.I.R.O., Canberra); 16.ii.1952 (K. P. Norris) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). Summit of Mt. Kosciusko; 20.iii.1938 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). Mt. Kosciusko, top of mountain; 17.xi.1938 (A. L. Tonnoir) 5 ♂, 1 ♀, 1 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Mt. Kosciusko, summit, 7300 ft; 18.iv.1937 (K. H. L. Key) 25 ♂, 22 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Mt. Kosciusko, 6850-7328 ft; 5.iii.1946 (K. H. L. Key) 4 ♂, 5 ♀, 2 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Mt. Kosciusko, near summit, 6200 ft; 28-30.i.1939 (A. J. Nicholson) 3 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Lake Cootapatamba, Mt. Kosciusko; (6785)-6850 ft; 5.iii.1946 (K. H. L. Key) 2 ♂, 3 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Near Seaman's Hut, Mt. Kosciusko; 9.ii.1946 (D. F. Waterhouse) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 2 miles E. of Mt. Kosciusko, 6435-6617 ft; 5.iii.1946 (K. H. L. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). Adam's Hut, Kosciusko Massif; 16.iv.1949 (E. F. Riek) 2 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Charlotte Pass, Kosciusko Massif; 6039 ft; 5.iii.1946 (K. H. L. Key) 1 ♂, 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia); 9.ii.1946 (D. F. Waterhouse) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 2 miles SE. of Charlotte Pass, Kosciusko Massif; 6065-6292 ft; 5.iii.1946 (K. H. L. Key) 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 4 miles SW. of Hotel Kosciusko, Kosciusko Massif, 5360-5508 ft; 6.iii.1946 (K. H. L. Key) 2 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Near hotel, Kosciusko Massif; 17.xi.1938 (A. L. Tonnoir) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). The Chalet, Kosciusko Massif; 12.iii.1952 (K. H. L. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra).

Intermediate between *K. t. tristis* and *K. t. restrictus*

Victoria.—Mt. Feathertop;³¹¹ 22.ii.1947 (Key, Carne, and Rothery) 6 ♂, 4 ♀, 1 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Mt. Hotham, 6100 ft; 23.ii.1947 (Key, Carne, and Rothery) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 1 mile SW. of Mt. Hotham; 23.ii.1947 (Key, Carne, and Rothery) 2 ♂, 1 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy

³¹¹ In the Victorian highlands, immediately to the north of Mt. Hotham. Summit elevation, 6303 ft.

of Natural Sciences of Philadelphia). 3 miles SW. of Mt. Hotham; 23.ii.1947 (Key, Carne, and Rothery) 5 ♂, 4 ♀, 1 juv. ♂, 2 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 4 miles SW. of Mt. Hotham; 23.ii.1947 (Key, Carne, and Rothery) 6 ♂, 4 ♀, 2 juv. ♂, 1 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 6 miles SW. of Mt. Hotham; 23.ii.1947 (Key, Carne, and Rothery) 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 10 miles S. of Harrietville; 23.ii.1947 (Key, Carne, and Rothery) 1 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra).

This species (in its typical subspecies), and incidentally the genus, was based on an unstated number of females taken on Mt. Kosciusko in February by M. Fuller, and sent to Sjöstedt by the Canberra Museum. The original description credits the material to "Mus. Canberra et Stockholm". The specimen selected as the type by the owning institution (Mus. Canberra) bears Sjöstedt's longhand label, and also his characteristic black-bordered red "Typus" label. This specimen is here designated as the lectotype of the species. It has lost its left antenna and the left cephalic and median limbs, and both caudal limbs have been detached at some time and replaced, injuries apparently due to shipping hazards of the past. Sjöstedt's 1935 comments,³¹² however, relate at least in part to the here-described and very distinct *K. cognatus*, as material now before me, bearing his determination as *tristis*, demonstrates. Sjöstedt's original figures of *tristis* are clearly of this subspecies, although his description of the genus shows that at that time he had material of both *t. tristis* and the here-described *cognatus* before him, sharing as it does features of both, his description of the prosternum, for example, clearly being drawn from an individual of the species here described as *cognatus*.

This subspecies is a truly alpine one, and as far as present information goes does not appear to occur much, if at all, below the 5000-ft level, and typical only on the Kosciusko Massif, there reaching the summit of Mt. Kosciusko, at 7300 ft. In this limited area it is found at the higher levels with the very distinct *Kosciuscola usitatus* here described, and below 5500 ft also with the equally new *K. cognatus*, from both of which it can at once be distinguished by its heavier form, trigonally, instead of rectangularly, lamellate prosternal spine, and much duller and less contrasted coloration. It is possible that each species may show definite environmental preferences, but these are matters for future consideration. The species *usitatus*, however, has a much broader area of distribution than typical *tristis*, extending beyond the Kosciusko Massif to the northward, although it is always a montane form. The intergradation of typical *tristis* to the south-westward, into the here-described *tristis restrictus*, is discussed beyond, and some suggestion there made as to the possible history of the two races.

Inasmuch as confusion has existed relative to the identity of this species, it

³¹² Kungl. Svenska Vetenskapsakad. Handl. (3) 15 (2): 79 (1935).

seems essential to present the identifying characteristics of each sex, as supplementary to the preceding key to the species of the genus.

Male (allotype).—Mt. Kosciusko, N.S.W. Elevation, 6850-7328 ft. March 5, 1946 (K. H. L. Key) (Division of Entomology Museum, C.S.I.R.O., Canberra).

Size relatively large (for the genus); form robust, more so than in the same sex of the other species of the genus, limbs relatively heavy; surface of most of body dully polished, of pronotal dorsum rugulose and impresso-punctate on the metazona.

Head appreciably inflated, as viewed from the dorsum, in cephalic aspect and in profile, in dorsal view its greatest breadth across genae slightly greater than its median length (as 26 to 23); occipital outline as seen in profile moderately convex and cephalad obliquely declivent over the interocular area and fastigium to the broadly rounded fastigio-facial angle, facial line, as seen in profile, very weakly convex and moderately retreating, but less so than in the same sex of any other species of the genus; fastigium as seen from the dorsum broad and bluntly produced, its outline obtuse-angulate (approximately 135°) with its apex relatively broad and subtruncate, greatest breadth of fastigium equal to 2.3 times the length of fastigium cephalad of the eyes (as 30 to 13), breadth of interocular space approximately equal to three-quarters of greatest breadth of fastigium (as 23 to 30), surface of fastigium very shallowly impressed, its bordering margins weak and but a trace of a median carinula present; frontal costa with lateral margins subparallel for most of their length, diverging slightly ventrad and there becoming subobsolete, surface punctate dorsad of median ocellus, distinctly and rather deeply sulcate about and ventrad of the median ocellus but evanescent near the supra-clypeal suture, supplementary facial carinae very weak, low, and rounded in cross section, infra-ocular sulcus well impressed, genae moderately inflated; eyes as seen from dorsum but moderately prominent, the greatest transverse breadth across them not quite six-sevenths that across genae as viewed from dorsum (as 72 to 85), in profile their basal outline is broad, the breadth equal to three-fourths the greatest depth (as 30 to 39), the cephalic border but weakly arcuate, the remainder of the periphery almost semicircular. Antennae 1.2 times as long as dorsum of head, moderately stout, composed of 20 articles, apex blunt.

Pronotum short and broad, its greatest overall breadth (caudad across lateral lobes) slightly greater than its greatest (not median) dorsal length (as 29 to 26), as seen from dorsum very distinctly strangulate mesad, in profile in no way sellate and with dorsal line nearly straight; cephalic margin of disk subtruncate, caudal margin of same distinctly but shallowly V-emarginate; median carina well marked and intersected solely, and there subobsoletely, by the principal sulcus, lateral margins of disk well marked and subcarinate, but less truly so than the median carina, as seen from dorsum subparallel caudad to the second transverse carina, thence caudad moderately diverging, distinctly intersected only by the second and third (principal) transverse sulci, metazona occupying one-third of the length of the pronotal dorsum; lateral lobes with their median depth but slightly less than four-fifths of their dorsal length (as 58 to 75).

cephalic margin oblique-arcuate, rounding over the ventro-cephalic angle to the subobtuse-angulate ventral margin, which passes over the obtuse-angulate ventro-caudal angle to the ascending subconcave caudal margin, intra-marginal and second transverse sulci deeply impressed, third (principal) sulcus equally evident but less extensive ventrad.

Tegmina of the type characteristic of the genus, with the anal field (in position of repose) horizontal, and the anal vein sharply separating the tegminal cross section into two planes, one horizontal (anal field), the other vertical (remainder of tegmen), in length extending caudad to the distal third of the second abdominal tergite, in outline subelliptical, as seen in lateral view with the costal margin fully arcuate, the apex narrowly rounded, the sutural margin, as seen from dorsum, in large part nearly straight, weakly arcuate to apex distad; reticulation of venational cribrosity relatively coarse, but two longitudinal elements clearly evident, a single one on the position of the humeral trunk, the other the anal vein dividing the fields, a much less evident axillary vein is intimated in the anal field.

Prosternum appreciably compressed, transverse, its outline as seen in cephalic or caudal aspect trigonal and subacute; mesosternal interspace moderately transverse, subrectangulate with caudo-internal angle of the lobes rounded, in breadth the lobes are subequal to the interspace; metasternal lobes narrowly separated caudad.

Abdomen dorsal with medio-longitudinal carina continuous, no evident supplementary paralleling lateral carinae on the more proximal tergites; ultimate tergite with rounded but broad furcula lobes, these well separated mesad; supra-anal plate slightly broader at base than median length, broad subtrigonal in outline, the converging margins shallowly emarginate immediately before the rectangulate apex, the latter weakly elevated, surface of plate with a shallow elliptical excavation medio-longitudinally in proximal half, margins slightly cingulate, transverse division only intimated marginally; cerci short, failing to reach quite as far caudad as the apex of the supra-anal plate, in profile conically tapering with apex subacute, as seen from dorsum subcompressed; subgenital plate moderately conical, the apex rounded in all aspects, the ventral outline subobliquely ascending to the apex as seen in profile.

Cephalic and median limbs robust, the femora definitely inflated and with their dorsal outlines convex as seen in profile, tibiae proportionately stouter than in other species of the genus. Caudal femora surpassing the apex of the abdomen by approximately half the length of the pronotum, robust, with external face somewhat inflated as viewed from dorsum, greatest femoral depth (at proximal fifth) contained four times in the femoral length (as 19 to 77); caudal tibiae but slightly shorter than the femora, external margin with 11-12, internal with 10 spines.

Female.³¹³—Mt. Kosciusko, N.S.W. Summit, 7300 ft. April 18, 1937 (K. H. L. Key) (Division of Entomology Museum, C.S.I.R.O., Canberra).

³¹³ As the lectotype is imperfect, the use of a topotypic perfect specimen for description and figuring is warranted.

The description of this sex is, as far as possible, made on a comparative basis with that of the male sex which here precedes it, and where differences are not emphasized it is understood that preceding comments apply.

Form proportionately the most robust in the genus, distinctly larger and heavier than in the male, limbs proportionately more slender.

Head of the same proportionate robustness as in the male, but, as usual, with the eyes slightly less prominent; greatest breadth across genae, as seen from dorsum, greater in proportion to the median length of the head than in the male, being as 33 to 26; profile of head as in male except that the fastigio-facial angle is even more broadly rounded and the facial line is slightly less retreating; fastigium broader and with angle of outline broader (approximately 145°), the apex somewhat wider, the fastigial disk even more weakly impressed and on the cephalic periphery alone, greatest breadth of fastigium equal to three times the length of the fastigium cephalad of the eyes (as 42 to 14), breadth of interocular space equal to eleven-fourteenths of greatest fastigial breadth (as 33 to 42); frontal costa broader than in male, lateral margins moderately converging dorsad of antennae to fastigio-facial juncture, and ventrad on face becoming sub-obsolete, median sulcation present about and over most of the costa ventrad of the median ocellus, but shallower and less sharply defined laterad; eyes somewhat less prominent than in male, the breadth across them equal to five-sixths that across genae as viewed from dorsum (as 87 to 103), in profile their basal outline is even broader than in the male, the breadth being equal to slightly more than four-fifths of their depth (as 33 to 40). Antennae³¹⁴ 1.4 times as long as dorsum of head.

Pronotum broader and stouter, proportionately, than in the male, its greatest overall breadth caudad across lateral lobes equal to 1.25 times the greatest (not median) dorsal pronotal length (as 40 to 32), as seen from dorsum somewhat less distinctly strangulate than in the male, the disk as a whole regularly broadening caudad, dorsal profile as in the male; caudal margin of disk less obviously V-emarginate owing to greater flattening of the lateral halves of the margin; median and lateral carinae of disk and of the transverse sulci of the same as in male, except for the more strumose build of the lateral carinae and their regular divergence caudad throughout their length; lateral lobes as in male.

Tegmina essentially as in male, but slightly shorter, reaching only to proximal portion of second abdominal tergite, in proportions slightly broader.

Interspace between mesosternal lobes much more strongly transverse than in male, with internal margins of lobes, as well as caudo-internal angles of same regularly arcuate; interspace between metasternal lobes equal in breadth to the distance between the outer borders of the metasternal foveolae.

Supra-anal plate in outline much resembling the same area in the male sex, in transverse section distinctly more arcuate, surface sculpture with the proximo-mesad impression and the cingulation of the margins seen in the male also

³¹⁴ In the described female the antennae have but 19 articles, probably owing to coalescence of certain articles seen as distinct in the described male.

present but more weakly indicated; cerci very short, but slightly more than one-third the length of the supra-anal plate, conically tapering; dorsal ovipositor valves relatively thick as seen from dorsum, as viewed in profile their apices are moderately upcurving, dorso-external margins virtually entire,³¹⁵ dorsal surface moderately excavate distad and intra-marginally laterad, ventral ovipositor valves much narrower than dorsal, but weakly decurved distad, ventro-external margin with a very low rounded proximal lobule, lateral plates short and deep, with distal and dorsal margins broadly and unitedly arcuate, apex at straight ventral margin subacute; subgenital plate rather broad, with a low, rather blunt median process of the distal margin, the lateral sections of which are subconcave, passing regularly into the lateral borders of the plate.

Cephalic and median limbs much less robust than in the male. Caudal femora reaching to, but not surpassing, the apex of the abdomen, somewhat more slender than in the male, external face not as inflated as in male, greatest femoral depth contained 4.2 times in femoral length; caudal tibiae with external margin having 10-11, internal 11 spines.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Greatest Caudal Breadth Across Lateral Lobes of Pronotum	Length of Tegmen	Length of Caudal Femur	Greatest Depth of Caudal Femur
Typical <i>tristis tristis</i>							
♂, Summit, Mt. Kosciusko, N.S.W. 7300 ft	19.0	5.8	3.9	4.1	3.6	11.6	3.0
♂, Summit, Mt. Kosciusko, N.S.W. 7300 ft	22.6	6.6	4.4	4.5	3.6	12.0	3.1
♂, Mt. Kosciusko, top of mountain, N.S.W.	15.7	— ³¹⁶	3.6	3.8	2.68	10.7	2.84
♂, Mt. Kosciusko, top of mountain, N.S.W.	19.5	7.1	4.1	4.2	3.4	11.2	3.0
♂, Mt. Kosciusko, N.S.W., 6850-7328 ft	18.7	5.5	3.7	4.1	3.6	11.0	3.0
♂, Mt. Kosciusko, N.S.W., 6850-7328 ft	16.8	6.7	4.4	4.5	3.7	12.3	3.1
♂, Mt. Kosciusko, N.S.W., 6850-7328 ft, <i>allotype</i> , above described	19.6	5.5	4.1	4.5	3.7	12.1	3.0
♂, Lake Cootapatamba, Mt. Kosciusko, N.S.W. (6785) -6850 ft	18.8	5.2	4.4	3.6	3.0	11.0	2.37
♂, 2 miles E. of Mt. Kos- ciusko, N.S.W., 6435-6617 ft	19.0	5.3	3.7	4.1	3.4	10.8	2.84
♂, Adam's Hut, Mt. Kos- ciusko, N.S.W.	19.6	6.6	4.1	4.4	3.6	12.0	3.1

³¹⁵ Irregularly micro-crenulate under fair magnification.

³¹⁶ Lacking or incomplete.

MEASUREMENTS (mm) (Continued)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Greatest Caudal Breadth Across Lateral Lobes of Pronotum	Length of Femur	Length of Caudal Femur	Greatest Depth of Caudal Femur
♂, Adam's Hut, Mt. Kosciusko, N.S.W.	20.1	7.2	4.2	4.5	3.9	13.4	3.3
♂, 4 miles SW. of Hotel Kosciusko, N.S.W., 5360-5508 ft	18.9	7.1	3.6	3.7	3.7	12.4	3.0
♂, 4 miles SW. of Hotel Kosciusko, N.S.W., 5360-5508 ft	19.8	6.3	4.5	4.4	3.4	12.1	3.0
♂, The Chalet, Kosciusko Massif, N.S.W.	18.7	6.0	3.7	4.4	2.68	10.7	2.05
♀, Mt. Kosciusko, N.S.W., type	20.1	— ³¹⁶	4.8	5.6	3.7	15.7	3.5
♀, Summit, Mt. Kosciusko, N.S.W., 7300 ft	26.0	— ³¹⁶	4.8	6.3	4.4	13.4	3.4
♀, Summit, Mt. Kosciusko, N.S.W., 7300 ft (above-described female)	25.6	6.7	5.0	6.3	3.7	14.8	3.4
♀, Summit, Mt. Kosciusko, N.S.W., 7300 ft	30.2	5.5	5.8	6.7	4.1	16.0	3.7
♀, Mt. Kosciusko, N.S.W., 6850-7328 ft	23.9	6.4	5.2	6.3	4.4	15.4	3.6
♀, Mt. Kosciusko, N.S.W., 6850-7328 ft	27.4	7.1	5.6	6.7	4.5	16.4	3.9
♀, Mt. Kosciusko, N.S.W., 6200 ft	20.2	6.9	4.7	5.5	3.4	14.0	3.1
♀, Mt. Kosciusko, N.S.W., 6200 ft	28.3	6.4	5.0	6.4	4.5	15.0	3.7
♀, Lake Cootapatamba, Mt. Kosciusko, N.S.W., (6785)-6850 ft	29.8	5.8	5.3	5.8	3.7	14.8	3.6
♀, Lake Cootapatamba, Mt. Kosciusko, N.S.W., (6785 ft)	25.1	7.1	5.5	6.4	4.5	15.9	3.3
♀, 2 miles SW. of Charlotte Pass, Kosciusko Massif, N.S.W., 6065-6292 ft	23.1	6.3	5.2	6.0	3.7	15.1	3.3
♀, 2 miles SW. of Charlotte Pass, Kosciusko Massif, N.S.W., 6065-6292 ft	27.5	7.2	5.2	5.6	3.7	14.6	3.7
♀, Charlotte Pass, Kosciusko Massif, N.S.W., 6039 ft	25.4	6.7	5.0	6.1	3.9	14.3	3.4
Intermediate between <i>K. t. tristis</i> and <i>K. t. restrictus</i>							
♂, Mt. Feathertop, Vic.	16.0	5.6	3.3	3.3	2.84	10.5	2.84
♂, Mt. Feathertop, Vic.	17.7	5.6	3.9	4.4	2.21	11.3	2.84

MEASUREMENTS (mm) (Continued)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Greatest Caudal Breadth Across Lateral Lobes of Pronotum	Length of Tegmen	Length of Caudal Femur	Greatest Depth of Caudal Femur
♂, 3 miles SW. of Mt. Hotham, Vic.	17.2	— ³¹⁷	3.6	3.6	3.1	11.3	2.84
♂, 3 miles SW. of Mt. Hotham, Vic.	18.4	6.4	3.7	3.6	3.4	11.6	2.68
♂, 4 miles SW. of Mt. Hotham, Vic.	15.1	5.0	3.0	3.3	2.84	10.5	2.37
♂, 4 miles SW. of Mt. Hotham, Vic.	18.1	6.4	3.9	3.7	3.4	11.2	2.68
♀, Mt. Feathertop, Vic.	26.2	6.4	5.0	6.0	4.4	14.2	3.6
♀, Mt. Feathertop, Vic.	27.0	7.5	5.5	6.6	4.5	16.0	3.9
♀, 4 miles SW. of Mt. Hotham, Vic.	28.3	— ³¹⁷	5.0	6.1	4.4	15.1	3.6
♀, 6 miles SW. of Mt. Hotham, Vic.	22.8	— ³¹⁷	5.2	5.5	4.8	15.0	3.3

These measurements show that appreciable size variation is found in representatives from the same locality, a tendency which is not at all rare in alpine acridids. Microclimatic factors or environmental controls may explain what is seen, and adjustment to a relatively limited life-cycle also may be important. As a whole the largest and the smallest individuals of both sexes before me were taken at or above 6850 ft on Mt. Kosciusko, which would indicate that elevation alone is not responsible for either size extreme.

Structural variation.—The more evident features of individual fluctuation are in details of the head and pronotum and degree of size development of the tegmina. The fastigium in both sexes, as viewed from the dorsum, shows a moderate degree of variation in the exact angulation of the outline, and also in the depth and exact extent of the impression of the fastigial disk. There is, further, variation in whether a medio-dorsal discal carinula is moderately indicated, obsolescent, or completely absent. The frontal costa shows little variation, other than in exact breadth.

The pronotum in the female, as seen from the dorsum, averages more appreciably strangulate in the entire outline in the female than in the male, and in the female there is more evidence of variation in the ratio of greatest caudal breadth of the pronotum—across lateral lobes—to pronotal median length than in the male, although this is due to some extent to variation in the pronotal length itself, which shows considerable plasticity apart from general bulk. In the male sex, in dorsal view, the lateral angles of the pronotal disk may (usually) or may not be faintly strangulate at cephalic fourth, while the dorsal surface varies somewhat individually in both sexes in the emphasis and extent of its rugulosities. The caudal margin of the pronotal disk shows

³¹⁷ Accurate measurement not possible without relaxation.

in both sexes appreciable individual variation in the exact depth and degree of angulation of its emargination, as well as in the strength of the convexity of the lateral sections of the same margin. There is also considerable variation in the emphasis of the median carina of the pronotum, and very definitely so in the relative strength of the rugulosity of the pronotal disk. In profile, in the male, the pronotum infrequently has its dorsal outline faintly concave caudad, while others of both sexes show some shallow convexity of the whole of the same outline.

The tegmina vary somewhat in length proportionately in both sexes, but this is more frequent in the males than in the females. In a few males their apices do not extend caudad of the distal margin of the proximal abdominal tergite, although they generally reach well over the second one. There are a few individuals which, from early injury or some other factor, have one tegmen with arrested development, which in size does not match its more normal mate. The selected lectotype has the left tegmen aborted, and not more than half as long as the normally sized right one.

The male supra-anal plate has some variation in its sculpture, i.e. whether an intimation of a transverse division may or may not be evident, a condition frequently found in acridids and reflecting the homology of this area. This division is generally not evident in this subspecies, but again may be reasonably well marked.

There is some little variation in the exact degree of the inflation of the cephalic femora, a fluctuation seen to be individual, and similarly evident in numerous species which have these areas appreciably inflated in the male sex. However, in typical *t. tristis* they are never as slender or as little inflated as in *K. t. restrictus*.

In the series listed is a single male from "The Chalet", Kosciusko Massif, which is of unusual interest. It may possibly be an intersex, or again merely a teratological or parasitized male. Without evidence from the internal genitalia, impossible to secure in a dried specimen, I must refrain from further speculation. This individual is exceedingly small (measurements given in the preceding table), yet is stockier and more robust than a normal male, the head is no broader than usual in the male, and its fastigium as in the latter, the pronotum in proportions is between what we see in a normal male and a normal female, the cephalic and median femora are proportionately shorter and by no means as inflated as usual in the male sex, no furcula is present, the supra-anal plate is of the generalized type seen in the female sex, the cerci are much shorter than in the normal male, and of the size and shape of the female, while the subgenital plate is of the normal male type.

Coloration.—In view of the very recent and most important studies by Key and Day bearing on the temperature-controlled physiological colour response in *K. tristis*,³¹⁸ and their meticulous observations on this in nature on the upper

³¹⁸ "A temperature-controlled physiological colour response in the grasshopper *Kosciuscola tristis* Sjöst. (Orthoptera: Acrididae)." By K. H. L. Key and M. F. Day. Aust. J. Zool. 2: 309-39, 2 Text-figs., Plates 1 and 2. November 1954.

"The physiological mechanism of colour change in the grasshopper *Kosciuscola tristis* Sjöst. (Orthoptera: Acrididae)." By K. H. L. Key and M. F. Day. Aust. J. Zool. 2: 340-63, 8 tables, 7 Text-figs. November 1954.

levels of the Kosciusko Massif, as well as their elucidation of the physiological mechanism producing these changes, any consideration of the coloration of the present species naturally should be based on their detailed study. The present work must, of necessity, be based almost entirely upon dried museum material, and notes on the colour of living individuals are rarely available. The studies of Drs. Key and Day are so important, and so sweeping in their evidence and conclusions, that it is essential that the student examine both of these exceptionally valuable contributions, accompanying one of which is a coloured plate illustrating the dark colour phase³¹⁹ and the blue colour phase of the present species. These two phases, as seen in living material, are shown to be definite responses to temperature conditions, particularly in the male sex, the bright greenish blue coloration being evident at temperatures above about 25°C, the dull near-black condition below about 15°C.

The carefully prepared analysis of the colour phases of *tristis* given by Key and Day is so important, not only for a consideration of this subspecies, but in its basic documentary evidence, that it is here quoted *in extenso*.³²⁰

"The following descriptions of the colour of *K. [t.] tristis* at the two extremes corresponding to warm and cold conditions are based on a few insects maintained at 4.4°C and 35°C for a period necessary to ensure full accommodation. In the male the change is from an almost uniformly near-black insect to an almost uniformly greenish blue insect. In the female there is a clearly marked, somewhat variable pattern, and in addition there are two distinct colour forms, probably under genetic control, in one of which the pronotal disk and certain other parts are green at the higher temperatures. Blue is virtually absent in the female, the colour change on passing from warm to cold conditions consisting of a general darkening and a replacement of the green by near-black. A small percentage of the males used in the laboratory experiments were distinctly greener than average in the pale phase. These gave rise to some difficulty in determining the colour rating; they may correspond genetically to the green form in the female. The typical coloration of the male at the two extremes is illustrated in Plate 1.

"(i) *The Male*

"*Dark phase* (Plate I, Fig. 1).—Head black, except for the clypeus and mouth-parts, but including the mandible. Clypeus black in the upper part; remainder of clypeus and the mouth-parts (except for the black mandible) shading through a narrow zone of brown dorsally to faintly bluish straw ventrally. Antenna dull olive to olive-brown on all faces. Eye black. Pronotum black throughout, the anterior pale spot on the lateral lobe very faintly lighter than the rest. Meso- and metanotum and abdomen black or faintly indigo-black on the dorsal surface, being dark gray-brown towards the lower margins of the tergites, and

³¹⁹ As long ago as 1916 the present author proposed the term "chromatomorph" to specifically indicate a colour phase (Trans. Amer. Ent. Soc. 42: 268, footnote 29). The term is explicit and definite, yet does not attempt to postulate the type of mechanism responsible for the condition seen.

³²⁰ Vide *supra*: 322-5.

abdominal segments with the posterior margin faintly bluish white. Mesometasternum dark indigo-brown; abdominal sternites medium to light indigo-brown. Hind femur with the dorsal surface dull olive; ventral surface pale yellow-brown to dull yellow ochre, sometimes with a very faint olive tinge; external and internal faces light yellow-brown with an olive tinge. Hind tibia and anterior and middle legs essentially as hind femur on their dorsal and ventral surfaces. Tegmen straw to pale olive green above, median to dark olive green laterally, with the fine venation faintly paler.

"In the terminology of Ridgway (1912) the colour of the pronotal disk varies from 'greenish slate-black' to 'blackish green-gray', although many individuals would be classified simply as 'black'.

"Blue phase (Plate 1, Fig. 2).—Head deep prussian blue above, pale blue with grayish markings on the gena, pale blue on the face and mandible. Clypeus and mouth-parts (except the mandible) white with a very faint greenish blue tinge. Antenna medium to light olive-brown. Eye black. Pronotum prussian blue on the disk and for the most part on the lobe, but with a distinct black area around the second transverse sulcus on the lobe, and with pale spots on the lobe the same colour as the mouth-parts. Mesonotum and distal 2-3 abdominal segments prussian blue dorsally, metanotum and the remaining abdominal segments a slightly lighter, more greenish blue; lower margin of tergites shading into very pale blue; posterior margins narrowly bluish white. Mesometasternum and abdominal sternites very pale blue. Legs pale yellowish olive on dorsal surfaces, otherwise practically as in the dark phase. Tegmen practically as in the dark phase.

"The colour of the pronotal disk is in the vicinity of the 'terre-verte', 'Montpellier green', 'dark goblin blue', and 'deep bluish gray-green' of Ridgway.

"In the course of the change from the dark to the blue phase the under surface and the face are the parts most rapidly affected. The sides of the body and the dorsal surface of the meso- and metanotum and abdomen change more slowly, and the dorsal surface of the head and pronotum more slowly still. Thus, after only 15 min at 35°C, an originally maximally dark male transferred from 4.4°C was described as follows:

"Head dark bluish gray above, lighter on the gena, pale gray-blue on the face. Antenna medium dull gray-brown. Pronotum dark bluish gray on the disk, lighter on the lobes, where the black area around the second sulcus is distinct and the pale spots lightly differentiated in bluish cream. Meso- and metanotum and abdomen greenish gray-blue dorsally, becoming pale gray-blue towards the lower margins of the tergites. Mesometasternum and abdominal sternites very pale gray-blue.

"Thus after 15 min the colour of the face and under surface was almost that characteristic of warm conditions, notwithstanding that the internal temperature of the insect must have been in the vicinity of 4.4°C at the start of the period.

"(ii) The Female: Green Form

"Dark phase.—Head very dark brown above, dark brown on face, medium

brown on gena. Clypeus and mouth-parts mainly pearly gray, tinged with brown in part, especially towards dorsal margin of clypeus. Eye black. Pronotum very deep olive on the disk, almost black; lateral carina brown, bordered in part with black ventrally; lateral lobe very deep olive, with a longitudinal black bar in the centre of the prozona, bounded ventrally by two pale spots situated anterior and posterior to the second transverse sulcus respectively. Meso- and metanotum mainly dark brown. First abdominal tergite deep olive medially, narrowly black towards the sides. Remainder of abdomen with a deep olive to dark brown dorsomedian stripe, not sharply demarcated, and bounded on either side by a buff stripe bearing numerous small brown dots; the latter stripe bordered laterally by a broad black stripe extending down the lateral portions of each tergite and gradually passing into fawn towards its ventral margin. Mesometasternum and abdominal sternites fawn. A narrow, faintly bluish band occupies the posterior margin of each abdominal tergite and sternite, but is less evident towards the anterior and posterior extremities of the abdomen. Hind femur with the dorsal, external, and internal faces dull yellow-brown, with a suggestion of an olive tinge; ventral face dull chrome yellow. Hind tibia fawn. Anterior and middle legs varying shades of dull yellow-brown to dull chrome yellow.

"The colour of the pronotal disk is close to the 'olivaceous black (1)' of Ridgway.

"Pale phase.—Head olive green above, with a pattern of dark gray-brown markings; fastigial margins buff; gena a network of straw and olive; face pale bluish green. Clypeus and mouth-parts very pale bluish green. Eye black. Pronotum green on the disk; lateral carina mainly buff, bordered in part with black ventrally; lateral lobe green, with longitudinal bar fragmented at the second transverse sulcus, the anterior pale spot straw, the posterior one greenish straw. Meso- and metanotum a slightly yellowish green. Abdomen with a yellow-green dorsomedian stripe, not sharply demarcated, and bounded on either side by a more yellowish green; the latter bounded laterally by a black stripe, which on each tergite is broadest anteriorly and narrows posteriorly, not reaching the posterior margin; below and behind this stripe on each tergite, and less markedly along the whole of the posterior margin of the tergite, very pale slate blue. Mesometanotum and abdominal sternites very pale bluish green. Hind femur with the dorsal surface pale olive green; external face pale olive brown, with the herring-bone ridges very pale greenish; ventral face dull chrome yellow. Anterior and middle legs dull yellow-brown on dorsal and outer faces, with a faint olive tinge; dull chrome yellow on the ventral face.

"The colour of the pronotal disk is close to the 'spinach green', 'grass green', 'forest green', and 'deep dull yellow-green' of Ridgway.

"(iii) The Female: Brown Form

"Dark phase.—Head very dark brown throughout, except lower part of clypeus and mouth-parts, which are fawn to brownish fawn. Eye black. Pronotum very dark brown on the disk, not quite as dark as the dorsal surface

of the head; lateral lobe very dark brown, with a broad black bar on the prozona extending from the third sulcus to the anterior margin immediately below the lateral carina, not reaching the anterior margin more ventrally, and extending ventrally to below the anterior pale spot; posterior pale spot scarcely discernible. Meso- and metanotum and first abdominal tergite dark brown dorsomedially, black towards the sides. Remainder of abdomen with a dark brown dorso-median stripe bounded on either side by a medium brown stripe bearing small dark brown dots; the latter stripe bordered laterally by a broad black stripe extending down the lateral portions of each tergite and gradually passing into medium brown towards its ventral margin. Mesometasternum medium brown; abdominal sternites fawn with numerous light brown dots. A narrow straw band occupies the posterior margin of each abdominal tergite and sternite, but is less evident towards the anterior and posterior extremities of the abdomen. Hind femur with the dorsal, external, and internal faces dull yellowish brown, with a suggestion of an olive tinge (slightly darker than in green form). Other legs essentially as in green form.

"The colour of the pronotal disk is very close to the 'bone brown' of Ridgway.

"Pale phase.—Head medium gray-brown, with a medial dark gray-brown stripe; fastigial margins buff; gena a network of medium gray-brown and pinkish straw; face buff. Clypeus and mouth-parts very pale blue-gray, with pink overlay in places, especially on part of labrum. Eye black. Pronotum medium gray-brown on the disk; lateral lobe medium gray-brown, the black bar on the prozona as in the dark phase, the pale spots and an area near the anterior margin pinkish buff. Abdomen with a buff dorsomedian stripe, not sharply demarcated, and bounded on either side by somewhat paler buff; the latter bounded laterally by a black stripe, which on each tergite is broadest anteriorly, where it reaches the ventral margin, and narrows posteriorly; below and behind this stripe on each tergite, and less markedly along the posterior margin of the tergite almost to the top of the black stripe, very pale bluish straw, with a pinkish tinge anteriorly. Mesometasternum very pale blue-gray with a pink tinge; abdominal sternites faintly greenish straw. Hind femur with the dorsal surface pale olive brown; external face brown, with the herring-bone ridges narrowly buff; ventral surface dull chrome yellow. Anterior and middle legs dull yellow-brown on dorsal face, dull chrome yellow on ventral face.

"The colour of the pronotal disk is close to the 'mummy brown', 'sepia', and 'brownish olive' of Ridgway.

"It should be noted that the colour of the dark phase, especially in the male, is essentially dull, or 'matt'; this is not a specially noticeable feature of the pale phase."

With the above exceptionally valuable set of observations of fresh material available it would be superfluous to add a description drawn wholly from dry material. However, some notes from the series now before me may prove of service to one who may be examining only dry museum material, and comparison with dry material of *tristis* is necessary to characterize the other species of the genus. In preserved material *t. tristis* appears to be less varied

in coloration than the other members of the genus. In dry material green and brown colour phases are recognizable, but less contrasted than in the other species, and there is evident less individual variant features. Green phase individuals, in dry material before me, are all males and relatively few, that is, in the most pronounced development, and this may be due solely, in view of the observations quoted above, to the incidence of temperature factors at the time of collecting. However, as a matter of record, the green phase individuals before me are: Mt. Kosciusko summit, 3 ♂; Mt. Kosciusko, 6850-7328 ft, 2 ♂ (one the *allotype*); Adam's Hut, Mt. Kosciusko, 2 ♂; Lake Cootapatamba, Mt. Kosciusko, 1 ♂; 4 miles SW. of Hotel Kosciusko, 2 ♂. In these the general tone ranges from dull citrine to buffy olive, this colouring the head, pronotum, and abdomen, with the face paler and the limbs usually nearer olive-ochre or olive-yellow. The brown phase extreme averages near bister, grading through brownish olive until it virtually passes into the green phase. There are many shadings in tone between the darkest brown extreme and those which might be considered as closely approaching the green phase. In most of the brown phase individuals the face is not pale, but is unicolorous with the rest of the head. The eyes range from bister to buffy olive, depending on the general body colour, while the antennae are snuff brown to bister. Occasionally the post-ocular sides of the head and upper part, or even all, of the genae are paler, but this is seen only in a few females. Very rarely the dorsum of the abdomen has a medio-longitudinal bar of paler colour, which in the sole specimen with this well-marked is ferruginous in tone, this contrasted laterad by broad paralleling bands of blackish fuscous, the single female so marked, and another of the same sex with a less pronounced tendency, being from 6200 ft on Mt. Kosciusko, taken January 28-30, 1939. The selected lectotype also has this pale longitudinal bar moderately indicated. In no other specimen is it more than incompletely and imperfectly shown.

The tegmina in dry material range from unicolorous to appreciably bicoloured longitudinally, with the anal area paler, but in the majority the tonal difference is not at all strongly marked. In the majority of the males the tegmina are not definitely bicoloured, while in the bulk of the females that is the condition. While no green phase males have bicoloured tegmina, the brown phase of both sexes may or may not have bicoloured tegmina. In the bicoloured type the marginal and discoidal areas are generally of the body tone, the discoidal sometimes nearer fuscous than the marginal and hence rather contrasted, while the anal area ranges through buffy tones to as strikingly pale as chalcedony yellow, although this extreme is seen in but several females from the summit of and 6200 ft on Mt. Kosciusko. The cephalic and median limbs and the caudal femora range in tone from olive-ochre and olive-yellow through cinnamon to zinc orange, the former tones linked with the green phase, while apparently the cephalic and median limbs otherwise may vary in colour tone independently of that of the caudal femora. The caudal tibiae range from dull cadmium yellow to brownish glaucous, the former correlated with the paler caudal femora above mentioned, and thus with green phase males.

Bionomics.—The exceedingly careful observations of Key and Day³²¹ supply virtually all that we know on the habits, behaviour, temperature reactions, etc. of *tristis tristis*.

Intergradations with K. t. restrictus.—The material before me shows clearly that, while the here-described *K. t. restrictus* of the Mount Buffalo Plateau of Victoria is a well-distinct geographic subspecies, the representations of the species from points in the main chain of the Victorian highlands to the south-west of the Kosciusko Massif, i.e. Mt. Feathertop, Mt. Hotham, and the areas about the latter, are intermediate in character between the two subspecies. The degree of intermediacy is not uniform in the various features, as individuals closely approaching one or the other in one respect will be quite the opposite in another. As a whole these populations can be regarded as of purely intermediate value, although as individuals they show a broad range in the exact degree of their leaning toward one or the other of the terminal elements of the specific line. The Mt. Feathertop specimens, of both sexes, show fastigial outlines (as seen from dorsum) virtually covering all steps between the extremes, yet with this area narrower than in *t. tristis*, but blunter than in *t. restrictus*. In none from the same locality is the head as a whole quite as broad as in *t. tristis*, yet only a few are as narrow as in *t. restrictus*. In the same representation while the pronotum averages narrower than in *t. tristis*, in one it is virtually as broad as in the latter. The facial outline in the Mt. Feathertop series averages nearer that of *t. restrictus*, i.e. less rounded and more nearly straight oblique, but one male is essentially as in *t. tristis*, and in the female sex we find the range between the two extremes fully covered. In the larger series from Mt. Hotham, or its general neighbourhood, the male individuals show about the same degree of blending seen in the same sex from Mt. Feathertop, but as a whole the females average slightly nearer *K. t. restrictus*, although first one, then another, will more closely approach *t. tristis* in some single character. The series from Mt. Hotham and its vicinity can as a whole be rated as intermediate as that from Mt. Feathertop, but it shows a shade more of the *t. restrictus* influence than does the smaller lot from Mt. Feathertop.

Discussion.—As to the possible history of the two subspecies of *K. tristis*, it would seem that the species was more broadly distributed, and at somewhat lower levels, either before or during certain periods of the Pleistocene, so that with the passing of the latter cycle, and the augmenting of the general temperature, the population on the Mt. Buffalo Plateau became isolated, and its divergent tendencies from typical *tristis* became more fixed and strengthened, while those populations on the main Victorian highlands remained more closely and more continuously in contact with the New South Wales representation, hence their earlier divergent tendencies were continually held in check by infusions of the *t. tristis* stock coming from the north-east. Following this, with increasing limitation of conditions favourable for its existence, the population of typical *tristis* probably became localized on the Kosciusko Massif, and those of the

³²¹ Aust. J. Zool. 2: 310-21 (1954).

populations on the line of intergradation over the Victorian highlands doubtless narrowed down to isolated colonies at suitable elevations and in specific conditions. Similar parallels, with probably similar histories, can be found among the Acrididae of the montane areas of western North America.

Distribution.—Key and Day have already pointed out that *K. tristis* (and specifically *t. tristis*) is found above about 5000 ft on the Kosciusko Massif, but their record of the species on the Victorian highlands relates to either the here-described *tristis restrictus*, or intermediates between the two subspecies. On the Kosciusko Massif, as they state, *tristis* occurs only in the alpine and subalpine zones, and from 5000 ft to the summit of Mt. Kosciusko at 7316 ft. The material here studied and reported represents elevations between 5360 and 7300 ft. On the upper slopes of Kosciusko it occurs with *K. usitatus*, here described, which Key and Day refer to as "Sp. 2", and below approximately 5500 ft with *K. cognatus*, similarly here described, which they referred to as "Sp. 3". Of these *cognatus* has been confused with *tristis tristis* (as *tristis*) in past literature, but the three are abundantly distinct, and represent different lines of the genus. The condition intermediate between *t. tristis* and the here-described *t. restrictus*, of the Mt. Buffalo region of Victoria, as shown above, is present on Mt. Feather-top and on and about Mt. Hotham, in the main Victorian highlands.

Adult material before me give dates reaching from April 18, 1937, to November 17, 1938 (both dates represented by individuals from the summit of Mt. Kosciusko). A specimen in the instar preceding maturity was taken on Mt. Kosciusko on March 5, 1946, and numerous intermediate ones in the same instar in the Mt. Hotham, Victoria, region, on February 23, 1937. A November 17, 1938 immature individual represents several instars preceding maturity, while a February 23, 1947 individual of the intermediate series from the Mt. Hotham area represents the second instar preceding maturity.

KOSCIUSCOLA TRISTIS RESTRICTUS³²² n. subsp.

Plate 19, Figs. 200-202; Plate 20, Fig. 207; Plate 25, Figs. 336 and 337; Plate 26, Figs. 338-345

This subspecies in its typical development is limited to the relatively isolated Mt. Buffalo Plateau, immediately west of the upper Ovens Valley, Vic. Material of the species from the vicinity of Mts. Hotham and Feather-top, higher elevations in the main system of the Victorian highlands, but a limited air-line distance away, as has already been shown represents intermediates between *K. t. tristis* and *K. t. restrictus*.

Typical *K. t. restrictus* differs from typical *t. tristis* in its less robust, more slender form in both sexes, in the head being less inflated across the genae, the fastigium as seen from the dorsum narrower, and with its outline in the same view less broadly obtuse-angulate, while the frontal costa averages narrower dorsad in the male sex, with its lateral borders definitely cariniform, and the

³²² i.e. confined or limited, in allusion to its distribution.

facial line is more strongly retreating and straighter. As seen from the dorsum the pronotum is proportionately longer and narrower than in *t. tristis*, the tegmina of the male are also proportionately somewhat longer and narrower, with the apices sharper, and the cephalic and median femora of the male are much less strongly inflated, this also evident to a much lesser degree in the female. The supra-anal plate of the male is also somewhat more sharply trigonal in outline than in *t. tristis*.

Type.—♂; Mt. Buffalo,³²³ Vic., c. 5600 ft. February 21, 1947 (Key, Carne, and Rothery) (Division of Entomology Museum, C.S.I.R.O., Canberra).

The following descriptions of this subspecies are comparative with the preceding ones of *K. t. tristis*.

Form distinctly less robust and more slender, the depth of the body also somewhat less, size but slightly smaller, surface as a whole similar, but dorsum of pronotum less rugulose and with metazonal punctulae not as coarse.

Head distinctly narrower, as seen from dorsum its greatest breadth across genae subequal to its medio-dorsal length; as seen in profile the fastigio-facial angle is more prominent and more narrowly rounded, while the facial line is appreciably more retreating and slightly straighter; fastigium as seen from dorsum markedly narrower proportionately, its outline while obtuse-angulate definitely sharper than in *t. tristis* and with its apex but narrowly subtruncate, greatest fastigial breadth and length cephalad of the eyes essentially the same in proportions as in *t. tristis*, the impressions of the disk and the median carinula more evident than in *t. tristis*; frontal costa with lateral borders more strongly cariniform and the whole more narrowing dorsad at the fastigio-facial juncture, the costal sulcation as a whole less concave and more angulate in the cross section of its excavation; ventral border of the genae straighter than in *t. tristis*. Antennae 1.8 times as long as the dorsum of head, not quite as stout as in the male of *t. tristis*, apex not quite as blunt, composed of 20 articles.

Pronotum of the same general type as in *t. tristis*, but narrower and more compressed, its greatest overall breadth (caudad across lateral lobes) no greater than its greatest (not median) dorsal length, as seen from dorsum very slightly strangulate mesad, much less so than in *t. tristis*, in profile with dorsal outline as in *t. tristis*; margins of disk much as in *t. tristis*, but cephalic one more arcuate; median carina narrower and more sharply etched than in *t. tristis*, cut only by the principal sulcus and there more distinctly than in *t. tristis*, lateral margins of disk more distinctly carinate than in *t. tristis*, but also less markedly so than the median one, as seen from dorsum in direction and in intersection as in *t. tristis*, dorsal proportions of prozona and metazona as in *t. tristis*; lateral lobes slightly shorter and proportionately deeper than in *t. tristis*, their median depth being equal to five-sixths of their dorsal length (as 50 to 60), margins of lateral lobes much as in *t. tristis*, but caudal margin with its oblique dorsal two-thirds more definitely convex, impressed sulci much as in *t. tristis*.

³²³ An isolated monadnock about 12 miles WSW. of Bright (latter in Ovens Valley). Information supplied by Dr. Kev, 1949.)

Tegmina in character as in *t. tristis*, slightly narrower, with the apex rectangulate as seen in lateral view, instead of narrowly rounded as in *t. tristis*, venation as in *t. tristis*.

Prosternum in general pattern as in *t. tristis*, but with the outline sharply acute at the apex; mesosternal lobes and interspace very similar to but somewhat shallower than in *t. tristis*; metasternal lobes essentially as in *t. tristis*.

Abdomen less robust proportionately than in *t. tristis*, carinal development and emphasis as in that subspecies; ultimate tergite with lobes of the furcula very similar to, but slightly more trigonal than, those of the male of *t. tristis*; supra-anal plate slightly narrower than in *t. tristis*, the greatest proximal breadth subequal to the median length, the outline more sharply trigonal than in *t. tristis*, and with the lateral, distad converging sections somewhat straighter, and less arcuate than in *t. tristis*, but with the immediately preapical emargination equally evident, the apex not appreciably elevated, while the surface of the plate has the medio-proximal impression narrower and more sharply impressed, and the medio-distal area has a distinct but much weaker, and not connected, similar impression, lateral areas of surface and margins as described for *t. tristis*; cerci in general type as in *t. tristis*, but longer, faintly surpassing the apex of the supra-anal plate, and consequently more attenuate as seen in profile; subgenital plate somewhat more conical than in *t. tristis*, the apex as seen in profile more narrowly rounded.

Cephalic and median limbs similar to, but much less robust than in *t. tristis*, and with the femora distinctly less inflated and their dorsal outlines slightly less strongly convex as seen in profile, tibiae more slender than in *t. tristis*. Caudal femora surpassing the apex of the abdomen by a distance equal to approximately two-thirds the length of the pronotal disk, somewhat less robust and more slender as seen from the dorsum than in *t. tristis*, the dorso-external and ventro-external faces narrower than in the latter, the greatest femoral depth (at proximal fifth) contained four times in the femoral length (as 17 to 68) as in *t. tristis*; caudal tibiae with proportionate length as in *t. tristis* but more slender, external and internal margins each with 11 spines.

Allotype.—♀; same data as type.

The description of this sex is made comparatively with the preceding description of the male of this subspecies, and that of the female sex of *t. tristis*.

Form somewhat more slender than that of the female sex of *t. tristis*, but proportionately much more robust than the male sex of *t. restrictus*, limbs, as in the male sex, somewhat more slender than in *t. tristis*, but this is less decided than in the male sex.

Head of the same general build as in the female of *t. tristis* but less robust, and as a whole more regularly narrowing to the fastigial apex; greatest breadth across genae, as seen from dorsum, slightly less in proportion to the median length of the head than in the female of *t. tristis*, being as 31 to 25; profile of head as in the male except that the fastigio-facial angle is more broadly rounded and the facial line is slightly less retreating and very weakly arcuate; fastigium

much resembling that of the female of *t. tristis* but not as broad, impression of disk narrower than in the female of *t. tristis* and the median carinula is more clearly indicated but low, greatest breadth of fastigium equal to 2.8 times the length of the fastigium cephalad of the eyes (as 37 to 13), greatest breadth of interocular space proportionately as in the female of *t. tristis*; frontal costa in general as in the female of *t. tristis*, but the sulcation continues evident dorsad of the median ocellus between the antennal bases; eyes with greatest breadth across them slightly more than four-fifths that across genae as viewed from dorsum (as 80 to 95), in basal outline somewhat narrower than in the female of *t. tristis* and with their axes somewhat more oblique, the breadth of basal outline but two-thirds of its depth (as 30 to 45). Antennae with proportions as in male sex.

Pronotum showing the same differences in shape and proportions from the male sex of this subspecies as is found between the sexes of the other forms of the genus, its greatest overall breadth caudad across the lateral lobes equal to 1.1 times the greatest (not median) dorsal pronotal length (as 34 to 31), as seen from dorsum broadening caudad and virtually non-strangulate, the disk regularly expanding caudad, dorsal outline, as seen in profile, virtually straight; cephalic margin of disk subtruncate, caudal margin with emargination as in the female of *t. tristis* but slightly deeper mesad; median carina as in the female of *t. tristis* but slightly more finely moulded, narrowly intersected by the principal sulcus, lateral borders of disk more strongly carinate than in the female of *t. tristis*, as in that cut only by the principal sulcus; lateral lobes much as in the male sex, their greatest median depth nearly equal to three-fourths of their dorsal length (as 44 to 60), margin details as in the male sex.

Tegmina in proportionate size as in *t. tristis*, but with apex, as seen in profile, slightly more produced and subacute.

Prosternal process less sharply acute than in the male; sternal lobes and interspaces between the same essentially as in the female of *t. tristis*.

Abdomen somewhat less robust than in the female of *t. tristis*, medio-longitudinal carina of dorsal surface more finely cut than in the female of *t. tristis*; supra-anal plate definitely narrower than in the female of *t. tristis*, being more sublanceolate, its median length slightly greater than the proximal breadth (as 33 to 30), more strongly arched in cross section, the lateral sections more declivent, the apical outline obtuse-angulate, converging lateral margins slightly sinuate, medio-longitudinal impression of surface definite but shallow in proximal half of plate, but weakly marked distad, transverse carination subobsolete; cerci as in female of *t. tristis*; dorsal ovipositor valves, as seen from dorsum, not quite as stout as in the female of *t. tristis*, in profile similar, dorsal surface with concave excavation extending more proximad, ventral ovipositor valves as in *t. tristis*; subgenital plate with distal margin having the oblique lateral section less subconcave and more oblique.

Cephalic and median limbs slightly longer and more slender than in the female of *t. tristis*, this particularly true of the femora. Caudal femora much as

in the female of *t. tristis* but slightly narrower as seen from dorsum, greatest femoral depth contained 4.3 times in the femoral length; caudal tibiae with 10 external and 9-10 internal spines.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Greatest Caudal Breadth Across Lateral Lobes of Pronotum	Length of Fegmen	Length of Caudal Femur	Greatest Depth of Caudal Femur
♂, Mt. Buffalo, c. 5600 ft, Vic., <i>paratype</i>	16.5	5.5	3.0	3.3	2.65	9.6	2.37
♂, Mt. Buffalo, c. 5600 ft, Vic., <i>type</i>	19.0	6.3	3.4	3.4	3.1	10.7	2.68
♀, Mt. Buffalo, c. 5600 ft, Vic., <i>paratype</i>	22.1	6.0	4.7	5.5	3.9	14.0	3.3
♀, Mt. Buffalo, c. 5600 ft, Vic., <i>allotype</i>	24.7	6.0	4.8	5.5	4.4	15.3	3.6
♀, Mt. Buffalo, Vic., <i>paratype</i>	29.9 ³²⁴	— ³²⁵	5.3	5.8	4.7	16.1	3.7

Coloration.—The comments here made have, of course, been drawn solely from dried museum material, and in consequence are not fully comparable with the preceding quotation from Key and Day on the coloration of *K. t. tristis*, based on observations of living, or at least fresh, material. Speaking broadly the general coloration of *K. t. restrictus* is very similar to that of *t. tristis* but is somewhat less sombre, with the anal area of the tegmina usually more contrasted and often as vivid as chalcedony yellow, this in either sex, while in others it may be sayal brown, and more rarely hardly at all contrasted. The lateral angles of the pronotal disk in the females are usually pencilled to a variable degree with orange-cinnamon, these markings often continued over the occiput and briefly bordering the eyes mesad. The emphasis of these latter paler markings is usually increased by the blackish fuscous of the adjacent continuation on the lateral lobes of the post-ocular bars. This condition is not usually indicated in the males, and at no time is it as marked, or as extensive, as in the female. The available material indicates moderately distinct greenish and brownish phases, the latter proportionately more numerous in the female sex, although in the male those of a greenish cast outnumber the brownish ones. The contrast of the pale greenish yellow anal area of the tegmina seems indicated equally in the two colour phases and is apparently independent of the general tone. Also the tegminal contrast does not seem to be correlated with the intensity of the lining of the lateral angles of the pronotum, although these are generally indicated to some degree when the tegmina are well contrasted. The dorsal

³²⁴ Abdomen somewhat over-extended.

³²⁵ Too curled to measure.

surface of the genicular extremity of the caudal femora is appreciably, but not deeply, infusate in the males, although of variable emphasis. In the female sex this infuscation is usually less evident, and occasionally subobsolete, and never as pronounced as in some of the males.

Paratypes.—I have designated as paratypes 13 ♂ and 6 ♀ from Mt. Buffalo, Vic., February 21, 1947, taken by Key, Carne, and Rothery, and 15 ♂ and 7 ♀, with the same data but with the additional label "c. 5600 ft".

Variation.—While the actual and relative breadth of the frontal costa, particularly dorsad, is generally the same in the present representation, there is some variation in this respect, but no more than is found in *K. t. tristis*. The sulcation of the costa, while always present, varies considerably in emphasis and extent, and this variation is found in both sexes, but the greatest reduction in the emphasis of the sulcation is seen in females.

Intergradation with K. t. tristis.—This has been fully reviewed under *K. t. tristis*.

Distribution.—In its typical condition *K. t. restrictus* apparently is limited to the detached Mt. Buffalo Plateau, west of the upper Ovens River valley. As already shown, the material from the main chain of the higher Victorian highlands to the east and south-east of Mt. Buffalo has a *tristis* population which is as a whole intermediate between that of typical *tristis* of the Kosciusko Massif to the north-east, and the Mt. Buffalo *t. restrictus*.

Specimens examined.—72; 31 ♂, 16 ♀, 2 juv. ♂, 23 juv. ♀.

Victoria.—Mt. Buffalo; 21.ii.1947 (Key, Carne, and Rothery) 14 ♂, 7 ♀ (one pair *in coitu*) (*paratypes*), 8 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia); c. 5600 ft; 21.ii.1947 (Key, Carne, and Rothery) 17 ♂ (*type* and *paratypes*), 9 ♀ (*allotype* and *paratypes*), 2 juv. ♂, 15 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia).

KOSCIUSCOLA COGNATUS³²⁶ n. sp.

Plate 19, Figs. 199, 203-205; Plate 26, Figs. 346-355; Plate 27, Figs. 356-362

Kosciuscola tristis Sjöstedt, 1935, Kungl. Svenska Vetenskapsakad. Handl. (3) 15: 79 (in part, Tonnoir material only, Mt. Kosciusko, [New South Wales]).

Kosciuscola sp. 3 Key and Day, Aust. J. Zool. 2: 329, 330 (1954) (Kosciusko Massif, 4000-5500 ft, New South Wales).

This species is closely related to *K. usitatus*, here described, which latter occurs over the same general area as the present species, in addition reaching to the Victorian highlands, where *cognatus* is not known to be present. The preceding key to the species gives the readily discernible differences in the male genitalia, these chiefly in the more normal lobate form of the furcula, rather than the broad and shallow shell-like type seen in *K. usitatus*, and in the supra-anal plate having no paired lateral supplementary surface carinate ridges, as well in

³²⁶ i.e. *closely allied*, in relation to its affinity to *usitatus*, which occurs in much of the same territory as *cognatus*.

the portion of the cerci distad of the tooth being very short. In addition, the form in both sexes is somewhat more attenuate and less robust than in *usitatus*, with the head, as seen from the dorsum, more pyramidal. In the female sex the proximo-lateral tooth on the ventral surface of the ventral ovipositor valves is but moderately developed, and not as elevated or "peg-like" as in *usitatus*.

The nearest relative of *cognatus* is clearly *tasmanicus*, which agrees with *cognatus* in the above-mentioned points of difference from *usitatus*. However, *tasmanicus* can be distinguished from *cognatus* by the features given in the preceding key and those stressed in the following diagnosis of *tasmanicus*. The species *cognatus* and *tasmanicus* are clearly derivatives of the same stock, well distinct from either *tristis* or *usitatus*. For discussion of the possible history of *cognatus* and *tasmanicus* see beyond under "comments" in the latter species.

Type.—♂; Mt. Gingera, Australian Capital Territory.³²⁷ 5510-6092 ft elevation. January 30, 1952 (K. H. L. Key) (Division of Entomology Museum, C.S.I.R.O., Canberra).

Form appreciably more slender and more compressed than in the same sex of *K. t. tristis*; surface as a whole smoother and somewhat more shining, especially in lateral aspect.

Head, as seen from dorsum, appreciably more pyramidal than in *K. t. tristis*, the breadth across the genae, as seen from dorsum, being contained 1.2 times in the dorsal length of the head; fastigium as seen from dorsum, distinctly narrower and more produced than in *t. tristis*, lateral margins with their axes converging much more sharply than a right angle, the apical outline bluntly and rather broadly truncate, greatest fastigial breadth of fastigium equal to approximately twice its length cephalad of the eyes (as 25 to 12), greatest interspace between eyes subequal to three-fourths of greatest fastigial breadth (as 18 to 25), fastigial disk very shallowly and indefinitely biimpressed on each side of an equally indefinite median carinula; fastigio-facial angle as seen in profile broadly rounded but very definitely more subrostrate than in *t. tristis*, facial line distinctly more retreating than in latter but also very weak convex; frontal costa proportionately somewhat broader than in *t. tristis*, non-sulcate, supra-ocellar section appreciably biseriate punctate, no marginal carinae, these areas rounded dorsad of the ocellus and poorly defined ventrad of same; lateral (supplementary) facial carinae sub-obsolete ventrad; eyes no more prominent in dorsal view than in *t. tristis*, basal outline much as in *tristis*, but slightly sharper dorso-cephalad, greatest breadth contained 1.27 times in depth (as 11 to 14). Antennae equal to 1.5 times the median length of the pronotal dorsum (as 30 to 20), composed of 19 articles.

Pronotum relatively narrow, substrangulate mesad as seen from dorsum, greatest breadth caudad across lateral lobes equal to 1.15 times the median length (as 23 to 20), the greatest breadth across the lobes cephalad subequal to that caudad; cephalic margin of disk subtruncate, caudal margin of same very broadly and strongly obtuse-angulate emarginate, the converging arms of the angulation

³²⁷ A peak on the western boundary of the territory, about $1\frac{1}{2}$ miles S. of the latitude of McKeahnie Trig. Station. (Information supplied by Dr. Key, 1949.)

relatively straight, dorsum of pronotum rather narrow, the subcarinate lateral margining angles subclypsedral, with the narrowest point at the middle of the prozona, the discal surface evenly widening thence caudad, the greatest breadth at caudal margin 1.5 times that at the narrowest point (as 12 to 18), metazona of disk occupying but caudal fourth of discal length, surface of metazona finely rugulose; median carina distinct, well elevated, clearly cut only by principal sulcus; lateral lobes with their greatest depth equal to nearly three-fourths of their greatest dorsal length (as 18 to 23), outline of lateral lobes much as in *t. tristis* except that the cephalic margin is more strongly oblique, the ventral one more sharply angulate and the caudal one with its concavity slightly more ventrad and the more dorsal portion more straight oblique, while the ventral portion of the surface of the lobes is as a whole somewhat more concave.

Tegmina with their apices slightly surpassing the distal margin of the proximal abdominal tergite, spatulate in outline, greatest breadth slightly distad of middle and contained virtually 2.3 times in their length (as 28 to 64), apex well rounded, anal vein moderately elevated, discoidal element well developed but less elevated than anal.

Prosternal process transversely lamellate, in outline subquadrate, with distal margin very shallowly emarginate mesad. Interspace between mesosternal lobes quadrate,³²⁸ small, but half as wide as one of the mesosternal lobes; metasternal lobes subcontiguous caudad of the foveolae.

Metanotum and more proximal abdominal tergites with low and rounded but distinct lateral subcarinae paralleling the median carina, these demarcating laterad the medio-longitudinal pale bar of the abdominal dorsum, these subcarinae also limited to a relatively few tergites and disappearing distad; ultimate tergite with furcula well represented by a narrowly but distinctly separated pair of short subtrigonal lobules; supra-anal plate scutellate, transverse subquadrate in outline, its greatest proximal breadth equal to one and one-sixth times its median length (as 35 to 30), its lateral margins moderately arcuate convergent to broadly rounded disto-lateral angles, with the distal section of margin bisigmoid and with its median point obtusely produced, surface of plate with median elevated section bearing a shallowly impressed sublanceolate area proximad and a low tectate ridge distad, the more lateral sections subexcavate and without any accessory carinate ridges; cerci straight, short, but narrowly surpassing the supra-anal plate, tapering as seen in profile, proximad subcompressed as seen from dorsum, dorsad with an internally directed blunt trigonal tooth placed at one-fifth of the cercal length from the apex, and with the very short apical section of the cercus blunt conical; subgenital plate bluntly subconic as seen from dorsum, little produced, in profile with its apex vertically subtruncate, rounding ventrad to juncture with preceding sternite, dorso-lateral outline of plate as seen in profile subconvex, actual apex of margin very faintly compressed.

Cephalic and median femora definitely inflated, the median pair even more so than in *t. tristis*. Caudal femora much as in *t. tristis* but somewhat more

³²⁸ Varies in paratypic males to sublongitudinal and narrower.

compressed, with the external face more deplanate and the dorsal carina more compressed and less trigonal in cross section, genicular lobes deeper and with ventral margin more broadly arcuate; caudal tibiae with 10 spines on each extensor margin.

Allotype.—♀; Mt. Gingera, Australian Capital Territory. 6092 ft elevation. March 8, 1944 (Key and Pryor) (Division of Entomology Museum, C.S.I.R.O., Canberra).

The following description is comparative with that of the described female of *K. t. tristis*.

Form more slender and slightly more compressed than in *t. tristis*; surface as a whole rather smoother than in *t. tristis*.

Head, as in the male, more pyramidal as seen from dorsum, breadth across the genae to length of head as in male; fastigium as seen from dorsum distinctly narrower and more produced than in *t. tristis*, in outline rectangulate, hence much sharper than in latter, the apex rather more narrowly subtruncate, greatest breadth of fastigium equal to 2.26 times its greatest length cephalad of the eyes (as 34 to 15), greatest interspace between eyes compared with greatest fastigial breadth approximately as in male (as 26 to 34), fastigial disk with weak impressions as in male; fastigio-facial angle as seen in profile well rounded, but as definitely more subrostrate than in *t. tristis* as in the male sex; facial line more retreating than in female of *t. tristis*, of the same character but to a lesser degree than in the male sex of this species; frontal costa of the same character as in the male sex of *cognatus* but, as usual, definitely broader and with punctations dorsad less pronounced; lateral (supplementary) facial carinae even less evident than in male sex; eyes as seen from dorsum no more conspicuous than in *t. tristis*, basal outline as in female of latter. Antennae approximately 1.5 times as long as the median length of the pronotal disk (as 35 to 23), composed of 19 articles.

Pronotum with proportions much as in *t. tristis*, its greatest caudal breadth across lateral lobes equal to nearly 1.5 times the median length of the pronotal disk (as 34 to 23), the greatest breadth across the lobes cephalad being equal to but fifteen-sevenths of that caudad (as 30 to 34), the whole thus narrowing somewhat cephalad and appreciably substrangulate mesad; cephalic and caudal margins of disk as in male but the latter margin has its angulation lower and broader; dorsum of pronotum very much broader than in male, of the same general type of development but not as broad as the same area in the female of *t. tristis*, discal surface evenly widening caudad,³²⁹ not at all clypsedra, the lateral angles subcarinate and regular, more finely moulded than in *t. tristis*, the greatest breadth of the disk at the cephalic margin but little more than three-fifths that at the caudal margin (as 17 to 27), metazona of disk occupying slightly more than one-fourth of discal length, surface of metazonal disk more finely rugulose than

³²⁹ Occasionally the disk is weakly subclypsedra by a faint constriction briefly cephalad of the first transverse sulcus, but this tendency is never as pronounced, as definite, or as median in position as in the type male.

the same area of female of *t. tristis*, surface of prozonal disk weakly but more coarsely rugulose, median carina as in male; lateral lobes essentially as in male but with the angle of the ventral margin somewhat sharper and the caudal margin as a whole broadly but shallowly concave.

Tegmina more appreciably surpassing the distal margin of the proximal abdominal tergite, in form and character as in male.

Prosternal process basically as in male, but proportionately shorter and broader. Interspace between mesosternal lobes moderately transverse, subrectangulate, somewhat narrower than one of the mesosternal lobes, the mesodistal angle of the latter well rounded; metasternal lobes rather narrowly separated.

Metanotum and more proximal abdominal tergites with weak indications of the lateral subcarinae described for the male sex; supra-anal plate broad, sub-trigonal in outline, its greatest proximal breadth slightly greater than 1.2 times its median length (as 40 to 33), lateral margins converging sigmoid from above the cercal bases to the obtuse-angulate apex, surface of supra-anal plate convex transversely, without clearly defined sculpture except for a shallow ovate impression meso-proximad; cerci simple, conical, subcompressed proximad, with apex not reaching as far distad as the free margin of the infra-cercal plates, which margin, as seen in profile, is moderately arcuate; dorsal ovipositor valves somewhat more slender than those of *t. tristis* as seen from the dorsum, ventral ovipositor valves, as seen in ventral aspect, slightly more slender than those of *t. tristis*, with the proximo-ventral tooth of the external margin more strongly developed than in *t. tristis*, but much less evident than in *usitatus*, and lobe-like as seen in profile, lateral plates strongly developed and as deep as in *t. tristis*; subgenital plate with its distal margin deeply and angulately notched ventrad of each of the ventral ovipositor valves, surface of distal half of ventral surface moderately deplanate mesad.

Cephalic and median femora slightly longer proportionately than in the female of *t. tristis* and slightly more slender than in latter; caudal femora much as in the same sex of *t. tristis* but genicular lobes rather deeper and more broadly arcuate ventrad, as in the male sex; caudal tibiae with 10 or 11 spines on each extensor margin.

While it is evident from the above measurements that the smallest individuals, both male and female, are from Mt. Franklin at an elevation of 4980 ft, the opposite extreme (maximum) from the same locality is, in each sex, well within the mean for the species. Conversely, while the largest male is from Mt. Gingera at 6092 ft elevation, the next largest of that sex is from 4 miles SW. of Captain's Flat, a locality clearly lower, while the longest tegmina and caudal femora for the sex are found in a male from 4 miles NE. of Hotel Kosciusko, at an elevation of 4440 ft. The largest female in most respects is from 0.5 miles SW. of Hotel Kosciusko, at an elevation of 5086 ft, but the opposite extreme from the same locality is near the mean of the series for the sex. The single Countegany female, which is from a locality well removed from the general mountain uplift represented by all the others except those from Captain's Flat, is quite large, but

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Greatest Caudal Breadth Across Lateral Lobes of Pronotum	Length of Tegmen	Length of Caudal Femur	Greatest Depth of Caudal Femur
♂, Mt. Gingera, 5000-6000 ft, A.C.T., <i>paratype</i>	16.4	3.9	2.84	3.4	3.3	10.7	2.68
♂, Mt. Gingera, 5510-6092 ft, A.C.T., <i>type</i>	18.5	4.7	3.1	3.6	3.3	11.0	3.0
♂, Mt. Gingera, 6092 ft, A.C.T., <i>paratype</i>	19.3	5.3	3.1	3.6	3.1	10.8	2.84
♂, Mt. Tidbinbitta, 5124 ft, A.C.T.	17.2	5.0	3.3	3.7	3.1	9.9	2.68
♂, Mt. Tidbinbitta, 5124 ft, A.C.T.	18.0	5.3	3.4	3.7	3.3	11.2	3.0
♂, Mt. Franklin, 4980 ft, A.C.T.	15.4	— ³³⁰	3.0	3.3	2.37	9.1	2.37
♂, Mt. Franklin, 4980 ft, A.C.T.	18.5	5.0	3.3	3.6	3.0	10.5	2.84
♂, Ginini Flat, 5250 ft, A.C.T.	16.7	4.7	3.0	3.6	3.0	10.7	2.68
♂, Ginini Flat, 5250 ft, A.C.T.	18.0	5.3	3.3	3.7	3.3	11.0	2.84
♂, Bendora Arboretum, 4125 ft, A.C.T.	15.7	4.2	2.84	3.5	3.0	11.0	2.68
♂, Bendora Arboretum, 4125 ft, A.C.T.	18.0	4.8	3.1	3.6	3.1	11.8	2.92
♂, 4 miles SW. of Captain's Flat, N.S.W.	17.2	5.6	3.4	3.4	3.0	10.7	2.84
♂, 4 miles SW. of Captain's Flat, N.S.W.	18.8	4.4	3.4	3.7	3.0	12.0	3.0
♂, 0-5 miles SW. of Hotel Kosciusko, 5086 ft, Kos- ciusko Massif, N.S.W.	17.4	4.4	3.1	3.6	3.1	11.2	2.84
♂, 0-5 miles SW. of Hotel Kosciusko, 5086 ft, Kos- ciusko Massif, N.S.W.	18.0	5.2	3.1	3.4	3.3	10.5	2.84
♂, 4 miles SW. of Hotel Kosciusko, 5360-5508 ft, N.S.W.	16.6	4.5	3.1	3.4	2.68	10.8	2.84
♂, 4 miles NE. of Hotel Kosciusko, 4440 ft, N.S.W.	17.7	5.2	3.4	3.6	3.4	11.3	2.84
♀, Mt. Gingera, 6092 ft, A.C.T., <i>allotype</i>	23.2	5.6	3.9	5.5	3.9	14.0	3.3
♀, Mt. Gingera, 6092 ft, A.C.T., <i>paratype</i>	27.4	5.5	3.6	5.6	3.4	14.6	3.6
♀, Mt. Tidbinbitta, 5124 ft, A.C.T.	25.5	4.7	3.9	5.3	3.7	14.5	3.4

³³⁰ Damaged or lacking.

MEASUREMENTS (mm) (Continued)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Greatest Caudal Breadth Across Lateral Lobes of Pronotum	Length of Femur	Length of Caudal Femur	Greatest Depth of Caudal Femur
♀, Mt. Tidbinbilla, 5124 ft, A.C.T.	27.7	5.6	4.2	5.8	3.9	15.9	3.7
♀, Mt. Franklin, 4980 ft, A.C.T.	20.2	4.7	3.1	4.2	3.1	12.0	2.68
♀, Mt. Franklin, 4980 ft, A.C.T.	26.6	5.8	4.1	5.8	4.1	17.1	3.9
♀, Ginini Flat, 5250 ft, A.C.T.	26.7	5.5	3.6	4.7	3.4	11.5	3.3
♀, Ginini Flat, 5250 ft, A.C.T.	29.6	5.8	3.9	5.5	3.9	15.9	3.6
♀, Nr. Mt. Ginini, A.C.T.	23.6	4.8	3.9	4.8	3.9	15.0	3.3
♀, Nr. Mt. Ginini, A.C.T.	28.5	6.1	4.2	5.6	3.9	15.4	3.6
♀, Bendora Arboretum, 4125 ft, A.C.T.	22.9	5.5	3.6	5.2	3.6	14.8	3.4
♀, 4 miles SW. of Captain's Flat, N.S.W.	23.9	5.2	3.9	5.5	4.1	15.0	3.6
♀, Countegany, N.S.W.	28.8	— ³³¹	4.4	5.5	4.2	15.7	3.7
♀, 0-5 miles SW. of Hotel Kosciusko, 5086 ft, Kos- ciusko Massif, N.S.W.	23.9	5.0	3.9	4.8	3.7	14.2	3.4
♀, 0-5 miles SW. of Hotel Kosciusko, 5086 ft, Kos- ciusko Massif, N.S.W.	31.4 ³³¹	— ³³¹	4.5	5.8	4.5	15.9	3.7
♀, 4 miles NW. of Hotel Kosciusko, 4440 ft, Kos- ciusko Massif, N.S.W.	26.3	5.6	3.9	5.3	3.7	13.8	3.3
♀, 4 miles SW. of Hotel Kosciusko, 5360-5508 ft, Kosciusko Massif, N.S.W.	26.2	5.5	4.4	5.5	3.7	15.3	3.7

whether this has any special significance can be determined only when more material from the Gourock Range can be examined.

An analysis of the above measurements is of interest when extremes from localities are compared, and the differences in measurements here shown are tabulated. The range at a single locality, as a general thing, is very limited when checked by sexes. In both sexes the differences are greatest in body length, pronotal length, pronotal breadth, and caudal femoral length in the Mt. Franklin extremes (elev. 4980 ft), followed in some of the features by those from Mt. Gingera (5000-6092 ft).

³³¹ Abdomen somewhat abnormally extended.

Structural variation.—The more evident features of this type are in the exact degree of angulation of the fastigial outline as seen from the dorsum, some fluctuation in pronotal length, in the ratio of greatest breadth of the pronotum caudad across the lateral lobes to the pronotal length, in the degree of median constriction or substrangulation of the pronotum as seen from the dorsum, and in the degree of sharpness of the angle of emargination of the caudal margin of the pronotal disk. The range in the exact degree of the angle of the fastigial outline in the male sex is considerable, or from as broad as in the male type to a much narrower type, which has also been figured (see Plate 27, Fig. 362), both of these from the Mt. Gingera series taken at 6092 ft. In the female sex there is much less noteworthy variation in this outline. The fluctuation in pronotal length is well exemplified in the preceding measurements, while the tendency toward pronotal substrangulation shows some variation in both sexes and in the same series, i.e. that from Mt. Gingera alone. The variation in the degree of sharpness of the angle of the emargination of the caudal margin of the pronotal disk is moderate, and in both sexes, but is no more evident than in the related species. There seems to be some tendency toward greater sharpness of this angle in those with the narrower pronota than in those with the broader type, and this in both sexes, but there are exceptions to this.

Coloration.—Key and Day in their important work on colour response to temperature in *Kosciuscola*, and in which they refer to this species as "sp. 3", have given a few comments on the differences noted by them in this species from *t. tristis*, their observations on which latter have here been given at considerable length. Their remarks on *cognatus* (their "sp. 3") are: "At 4°C, face darker, brown to very dark brown above the clypeus, except in some females where this area was green. Mesometasternum brown to very dark brown, except along the sutures and posterior margin. At 35°C, both these regions were very pale gray or grayish white to pale buff. No clear differences on the abdomen." They further state, "we may conclude that the coloration of the dorsal and lateral surfaces of *Kosciuscola* spp. 2 [*usitatus*] and 3 [*cognatus*] corresponds to the pale condition of *K. [t.] tristis*, and that the colour change in the latter species is essentially a mechanism for reversible darkening."

As already emphasized in relation to the coloration of *K. t. tristis*, with solely dry material before me, I can present only what that material demonstrates. These show that *cognatus* has a more variegated coloration than *t. tristis*, and that well-marked green and brown phases are present, the former in its most marked condition, however, largely represented by females. The few males which clearly could be assigned to a green phase are from Mt. Gingera at elevations between 5510 and 6092 ft, from Mt. Tidbinbilla at 5124 ft, Ginini Flat at 5250 ft, and from 2 miles E. of Hotel Kosciusko, Kosciusko Massif at 5112 ft. The green phase females, on the other hand, while much less numerous in the available series than the brown phase ones, represent a larger number of localities than do the green phase males, including in these both the Gourock Range localities (i.e. Captain's Flat and Countegany).

The type and allotype are representative brown phase individuals, and may be described as follows: dorsum of head liver brown to carob brown with obscure median and lateral longitudinal cloudings of fuscous, post-ocular bars bister to fuscous, extending caudad over the dorsal portion of at least the lateral lobes of the prozona, dark post-ocular bar bordered ventrad by a narrow line of creamy or pinkish buff, this represented mesad on the lateral lobes by several longitudinal dashes of similar colour, ventral portion of genae largely pinkish buff separated from the more dorsal pale line by an area clouded with bister to fuscous, face ventrad of the median ocellus and mouth-parts dull pinkish buff in the male, fuscous to bister dorsad of the ocellus, this involving wholly or in part the immediately supra-antennal section of face, in the female the whole face and mouth-parts are brownish plumbeous, antennae bister, eyes cinnamon-brown (♂) to umber (♀); pronotum in ♂ liver brown on dorsum, lateral lobes more mummy brown to fuscous with the above-mentioned pale markings and the ventral cingulate margin finely pencilled with the same pale tone; pronotum in ♀ much as in ♂ except that dorsal surface is nearer prout's brown, while the lateral lobes narrowly cephalad and ventrad and on the metazona are nearer deep olive. Pleura largely fuscous with the usual pale lining pinkish buff. Tegmina with marginal and discoidal fields mummy brown to prout's brown, anal field pinkish buff, narrowly lined along the immediate sutural margin with the dark tone. Abdomen laterad with two-thirds of that aspect of the tergites of the fuscous brown to fuscous dark tone, the tergites ventrad of this as well as a narrow distal lining of each tergite of the pale tone, i.e. buff to very deep buff, medio-longitudinally the abdomen bears a subequally wide pale bar, shading from deep buff laterad to as deep as mars brown near the median carinula, this extending from the mesonotum to the last tergite; ventral surface largely dull and deep buffy, in the female the meso-metasternum tending toward plumbeous; cephalic and median limbs ranging from tawny to dull olivaceous, caudal femora with dorsal surface dull russet, paler near pregenicular region, external pagina and internal face dull olive-brown to prout's brown, ventral sulcus scarlet-red, with extenuo-ventral carina, more weakly the infra-paginal one, and a short pre-genicular portion of the ventral sulcus buff, genicular area, including the dorsal surface, which latter, however, is usually paler in the female, mummy brown to fuscous brown; caudal tibiae and tarsi plumbeous with the proximal extremity with a post-genicular annulus coloured the same as the femoral genicular area, caudal tibial spines cream coloured at base, fuscous tipped.

The green phase possesses much the same basic pattern as the brown phase, but has the dorsal surface of the head of the pronotum, most of the lateral lobes of the latter, the anal field of the tegmina in some males, all or most of the median section of the dorso-longitudinal pale bar on the abdomen, and the dorso-external face of the caudal femora ranging from as light as mignonette green to as dark as jade green. In the females and part of the green males the anal area of the tegmina is dull buffy as in the brown phase, while in the females the medio-dorsal abdominal pale bar is buffy laterad, in sharp contrast with the brown fuscous lateral bars. Pale narrow pinkish buffy lines are present

caudad of the dorso-internal border of the eyes in the green phase females, extending over the occiput and continued along the lateral carinae of the pronotal disk, this relieved on the external side of these carinae by a narrow contrasting line of fuscous. These pale lines may or may not be more obscurely indicated in the green phase male. The face in green phase female may be solidly mignonette green to ivy green, but in the male sex this can be as pale as dull buffy, while the genae show to varying degrees of emphasis the same pattern and tone of paler lines described for the brown phase; the luscous supra-antennal areas are generally present but not invariably so; antennae and eyes as in brown phase. Pronotum with lateral lobes infusate mesad surrounding the usual two cream-coloured areas. Cephalic and median limbs ranging from buffy brown to buffy olive; caudal femora and tibiae essentially as in brown phase, except as here qualified.

Between these two phases the present series presents a medley of interdigitating degrees of emphasis of one or more of the elements of the two basic patterns. The general tone may be quite a degree paler, and the pale pattern hence with a greatly stepped-up emphasis, while the converse is also true, with the pattern much less contrasted through a lesser degree of evidence. The Kosciusko Massif series is as a whole duller and less strongly coloured than those from the mountains of the Australian Capital Territory, and the few from the Gourock Range (Captain's Flat and Countegany). The extensive series from Mt. Gingera shows a broad range in the degrees of emphasis of this or that particular element of the pattern. One feature, called to my attention by Dr. Key, is the invariable presence in this species of the fuscous infuscation of the genicular extremity of the caudal femora. While sometimes this may be very weak dorsad, it is nevertheless present there and quite obvious in its lateral aspects. Another feature, which when fully developed is just as pronounced, is the infuscation of the supra-antennal sections of the facial channels. However, this latter may or may not be indicated, and in this respect it is far from as definite an "earmark" as the caudal femoral genicular infuscation. All the specimens from Australian Capital Territory localities show this facial infuscation, but it is very faint or lacking in one of four males from Captain's Flat, in the Gourock Range, and in 12 males and 5 of the females from the series representing localities on the Kosciusko Massif.

Paratypes.—I have designated 32 males and 18 females from the immediate vicinity of the type locality as paratypes, the data for these being: Mt. Gingera, 5510–6092 ft, 30.i.1952 (K. H. L. Key) 7 ♂, 4 ♀; Mt. Gingera, 5510 ft, 30.i.1952 (K. H. L. Key) 2 ♀; Mt. Gingera, 5000–6000 ft, 28.iv.1943 (Key, Clark, and Pryor), 1 ♂, 4 ♀; Mt. Gingera, 6000 ft, 27.iii.1951 (I. F. B. Common) 1 ♂, 1 ♀; Mt. Gingera, 6092 ft, 8.iii.1944 (Key and Pryor) 17 ♂, 34 ♀; Mt. Gingera, 6092 ft, 23.iv.1943 (Key, Clark, and Pryor) 1 ♂; Mt. Gingera, 17.iv.1951 (I. F. B. Common) 2 ♀; 1½ miles N. of Mt. Gingera, 5000 ft, 26.ii.1943 (L. D. Pryor) 2 ♂, 1 ♀.

Remarks.—Two specimens before me are of particular interest, both apparently males, one from Aggie-Franklin Saddle, A.C.T., 4601 ft, the other from Mt.

Gingera, 6092 ft, this latter included among the paratypes. The former is relatively small (length of body, 18.2 mm) but with its general build proportionately heavier than in the average male, yet by no means as robust as in female specimens. The fastigium as seen from the dorsum is rectangulate in outline, but hardly more robust than in some males, while the pronotum is very appreciably broader and proportionately shorter than in other males. It possesses no furcula; the supra-anal plate is less transverse in outline and almost sub-trigonal, while its surface has as its only sculptural feature the usual medio-proximal depression; the cerci are slightly smaller than in an average male and have the tooth proportionately weaker, while the subgenital plate has its dorsal margin less inflexed. The Mt. Gingera individual is rather smaller in size than the average of the sex but is no more robust than usual in the same. The fastigial outline, as seen from the dorsum, is as sharp as in the majority of the males, the pronotum is even slightly more compressed than in some of that sex. The furcula are represented on the left side by a very faint and shallow lobation, but none at all on the right side; the supra-anal plate in its simplicity is essentially as in the one described above; the cerci are even simpler than in the other one in that the portion distad of the weak tooth is even shorter proportionately, while the subgenital plate more resembles the norm of that sex and is even a little more compressed at the immediate apex than usual. The one feature in which both of these specimens agree and differ from all others seen is that the tegmina are greatly reduced, in neither surpassing the middle of the proximal abdominal tergite, while in the normal condition the tegmina of males cover this entire tergite and the base of the next (second). In the Mt. Gingera individual the right tegmen is as here described, while the left is a mere rudiment hardly surpassing the distal margin of the metazona. It may be argued these specimens are intersexes, but on this point internal evidence would be necessary, something not possible to secure in long-dried material. I feel that it is more likely that these individuals have been parasitized in earlier instars and that this has prevented their complete development, and that they are males in their general features, however, retaining some tendencies of their earlier stages, and probably were incapable of reproduction owing to atrophy or blocked structural, and possibly physiological, maturity. The tegminal condition is clear evidence of developmental disturbance, and what is seen there is not a tendency toward the opposite sex, but clearly imperfect development of these organs.

Distribution.—Higher areas of the Kosciusko Massif, and adjacent areas, New South Wales, similar elevations in the mountains of the Australian Capital Territory, and in portions of the Gonrock Range to the east in New South Wales. Key and Day³³² state that on Mt. Kosciusko this species occurs "from about 4000 ft to about 5500 ft". In the Kosciusko series here reported are specific records of material taken as low as 4095 and as high as 5508 ft. One specimen, perhaps labelled erroneously, gives "top of mountain".³³³ For the mountains

³³² Aust. J. Zool. 2: 329 (1954).

³³³ Dr. Key advises me (in litt. March 3, 1955) of his belief that this labelling is erroneous, as he feels *cognatus* does not reach the summit of Mt. Kosciusko.

of the Australian Capital Territory the details give elevations of from 4125 ft (Bendora Arboretum) to as high as 6092 ft on Mt. Gingera. The localities represented in the Gourock Range, to the east of the upper Murrumbidgee (4 miles SW. of Captain's Flat and Comtegany), may be at somewhat lower elevations than any of the others, but no altitude information is given on these specimens. The dates represented by the material before me give a seasonal range for adult individuals from November 12-13 (Alpine Creek, N.S.W.) to April 21 (Mt. Gingera, A.C.T.).

Specimens examined.—213; 120 ♂, 123 ♀.

Australian Capital Territory.—Mt. Gingera, 5510–6092 ft; 30.i.1952 (K. H. L. Key) 7 ♂ (*type* and *paratypes*), 1 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia); 5510 ft; 30.i.1952 (K. H. L. Key) 2 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra); 5000–6000 ft; 28.iv.1943 (Key, Clark, and Pryor) 5 ♂, 4 ♀ (*paratypes*) (Division of Entomology, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia); 6000 ft; 27.iii.1951 (I. F. B. Common) 1 ♂, 1 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra); 6092 ft; 8.iii.1944 (Key and Pryor) 17 ♂, 36 ♀ (*allotype* and *paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia); 17.iv.1951 (I. F. B. Common) 2 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 1½ miles N. of Mt. Gingera, 5000 ft; 26.ii.1943 (L. D. Pryor) 2 ♂, 1 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). NE. slope of Mt. Tidbinbilla, c. 4860 ft; 25.iii.1951 (K. H. L. Key) 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Mt. Tidbinbilla, 5124 ft; 25.iii.1951 (K. H. L. Key) 7 ♂, 3 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Aggie-Franklin Saddle, 4600 ft; 1.iv.1953 (K. H. L. Key) 2 ♂, 1 ♀; 4501 ± 5 ft; 8.iii.1944 (Key and Pryor) 2 ♂, 5 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Mt. Franklin; 31.i.1937 (Miss Cumpston) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra); 19.ii.1938 (T. G. Campbell) 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia); 4980 ± 25 ft; 8.iii.1944 (Key and Pryor) 8 ♂, 15 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Mt. Franklin Chalet, 4900 ft; 1.iv.1953 (K. H. L. Key) 2 ♂, 3 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 2 miles N. of Mt. Franklin, 4610 ft; 1.iv.1953 (K. H. L. Key) 3 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Snow Gum Arboretum, 3 miles N. of Mt. Franklin, 4650 ft; 1.iv.1953 (K. H. L. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). Saddle betw. Stockyard Creek and Snowy Flat, 5500 ± 100 ft; 8.iii.1944 (Key and Pryor) 1 ♂, 5 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Near Mt. Ginini; 13.iii.1951 (L. J. Chin-

nick) 3 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Ginini Flat, 5250 ± 50 ft; 8.iii.1944 (Key and Pryor) 5 ♂, 4 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Bendora Arboretum, 4125 ± 25 ft; 8.iii.1944 (Key and Pryor) 3 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia).

New South Wales.—Alpine Creek;³³⁴ 12–13.xi.1938 (A. L. Tonnoir) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Mt. Kosciusko; 14.ii.1934 (A. L. Tonnoir) 2 ♀³³⁵ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Kosciusko Massif; Jan. 1946 (L. R. Clark) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Top of mountain, Mt. Kosciusko; 17.xi.1938 (A. L. Tonnoir) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Near Seaman's Hut, Mt. Kosciusko; 9.ii.1946 (D. F. Waterhouse) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). Hotel Kosciusko; 14.iii.1952 (K. H. L. Key) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). Near Hotel Kosciusko; 17.xi.1938 (A. L. Tonnoir) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). Hotel Kosciusko, 5300 ft; 18.iv.1937 (K. H. L. Key) 7 ♂, 4 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 0–5 miles SW. of Hotel Kosciusko, 5086 ft; 6.iii.1946 (K. H. L. Key) 10 ♂, 4 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 2 miles E. of Hotel Kosciusko, 5142 ft; 6.iii.1946 (K. H. L. Key) 3 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra.) 3 miles NE. of Hotel Kosciusko, 4756 ft; 6.iii.1946 (K. H. L. Key) 10 ♂, 4 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 4 miles SW. of Hotel Kosciusko, 5360–5508 ft; 6.iii.1946 (K. H. L. Key) 5 ♂, 6 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 4 miles NE. of Hotel Kosciusko, 4440 ft; 6.iii.1946 (K. H. L. Key) 4 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., and Academy of Natural Sciences of Philadelphia). 6 miles NE. of Hotel Kosciusko, 4095 ft; 6.iii.1946 (K. H. L. Key) 4 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 4 miles SW. of Captain's Flat; 9.xii.1944 (K. H. L. Key) 4 ♂, 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Countegany;³³⁶ 1.ii.1937 (M. Fuller) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra).

³³⁴ "A creek running south to Eucumbene River a few miles east of Kiandra. The collecting point was probably near where the Kiandra-Adaminaby road crosses this creek, i.e. 6–7 miles ESE. of Kiandra, or about a mile west of West Denison." (Information from Dr. Key, 1948.)

³³⁵ These specimens are both labelled "Kosciuscola mistis Sj." in Sjöstedt's handwriting on a printed "Yngve Sjöstedt, det." label.

³³⁶ In Gounrock Range, nearly due E. of Cooma. Position approximately $36^{\circ} 12' \text{ S.}$, $149^{\circ} 28' \text{ E.}$ Elevation, $1000 \pm$ metres.

*KOSCIUSCOLA TASMANICUS*³³⁷ n. sp.

Plate 20, Figs. 208-211; Plate 27, Figs. 363-375

Kosciuscola sp. n., Sharman (1952), Pap. Roy. Soc. Tasm. 86: 109, Figs. 9 and 10 (Great Lake (3500 [feet]), Tasmania). [Chromosomes only.]*Kosciuscola* sp. n., Key, Pap. Roy. Soc. Tasm. 86: 128.

As already pointed out on a preceding page under *K. cognatus*, that species and *tasmanicus* are closely related and clearly derived from the same basic stock. The supra-anal plate and furcula of the male, which appear to be very good indices of general relationship in this genus, are of the same basic pattern in these two species, although the supra-anal plate is more conventionally subtrigonal in outline and less pentagonal in *tasmanicus* than in *cognatus*, while in the female the dorsal ovipositor valves are more slender, and the subgenital plate has its distal margin furnished with acuminate subconical lateral processes, no traces of which are seen in *cognatus*. The pronotum in the female, as seen from the dorsum, is more evenly, regularly, and more strongly bullate caudad. The caudal femora lack infuscation genicularly, which is always indicated in *cognatus*, while the caudal tibiae are more brownish, purplish, or olivaceous, and less glaucous. Also the green phase seems to greatly predominate in the female sex in the material available, and a number of the males seen are in that phase. Whether this latter is purely an expression of temperature conditions at the time of collection, or is of other significance, remains to be determined.

Type.—♂; Victoria Valley, near Ouse,³³⁸ Tasmania. January 30, 1948 (Key, Carne, and Kerr) (Division of Entomology Museum, C.S.I.R.O., Canberra).

As *K. tasmanicus* is exceedingly close to *K. cognatus*, the descriptions of the type and allotype here given are comparative with those of the same sexes of *cognatus*.

General size, form, and sculpture essentially as in *K. cognatus*.

Head as a whole very similar to that of the same sex of *cognatus*, fastigium as seen from the dorsum less robust cephalad than in the male of *cognatus*, the fastigio-facial juncture narrower, the converging lateral arms of the fastigial outline not quite as acutely convergent as in *cognatus*, and forming a right angle rather than a more acute one, the proportions of the fastigium, and also the ratio of the interocular space as described for *cognatus*, surface of fastigial disk as described for *cognatus*; fastigio-facial angle as seen in profile and facial profile as in *K. cognatus*; frontal costa appreciably narrower than in *cognatus*, particularly dorsad of the antennal bases, the lateral borders of the costa in that area weakly concave, instead of shallowly convex as in *cognatus*, no trace of marginal carinae, surface punctate, but less seriatly so than in *cognatus*; lateral (supplementary) facial carinae slightly more evident than in *cognatus*; eyes as in *cognatus*. Antennae as in *cognatus*.

Pronotum with the relatively weak median substrangulation seen in the male of *K. cognatus* also indicated, and the breadth caudad across the lateral lobes

³³⁷ In reference to its habitat.

³³⁸ While the labels give this locality as "near Ouse", Victoria Valley is 15 miles by road north of Ouse and about 9 miles air-line south-west of Lake Echo, and at an elevation in the neighbourhood of 2000 ft, while Ouse in the Derwent Valley is appreciably less than 1000 ft elevation.

has the same ratio to length as in the male of *K. cognatus*, disk of pronotum with the subcarinate lateral margins slightly more strongly diverging caudad than in *cognatus*; lateral lobes as in *cognatus*.

Tegmina as in male of *cognatus* except that the apices are somewhat sharper and less rounded.

Prosternal process as in *cognatus*. Interspace between mesosternal lobes subquadrate, broadening caudad, where its greatest breadth is subequal to but little less than the proximal breadth of one of the mesosternal lobes; metasternal interspace as in *cognatus*.

Metanotum and more proximal abdominal tergites with the same sculptural features as described in the male of *K. cognatus*, but with the lateral subcarinae somewhat more marked and slightly more extended distad on the abdomen; ultimate tergite with the furcula much as in *cognatus* but less trigonal and more rounded, and also more closely placed; supra-anal plate in general form more trigonal than in *cognatus*, greatest proximal breadth subequal to the median length, converging lateral margins moderately arcuate from their lateral bases to the preapical concavity of these margins (as well indicated here as in *cognatus*), apex of plate briefly rectangulate in outline,³²⁹ surface of plate much as in *cognatus* but disto-median section is more rounded transversely and not tectate; cerci much as in *cognatus* but slightly longer and with the distal section somewhat more attenuate, this more evident in lateral view; subgenital plate essentially as in male of *cognatus* but with apex in profile somewhat more rounded, vertically, and dorso-lateral outline of plate straighter.

Cephalic and median femora slightly more inflated than those of *K. cognatus* as seen from the dorsum. Caudal femora with proportions as in *cognatus*; caudal tibiae with 9-10 external and 10 internal spines.

Allotype.—♀; same data as type (Division of Entomology Museum, C.S.I.R.O., Canberra).

The following description is of noteworthy differences from those of the female of *cognatus*.

General size, form, and sculpture very similar to this sex of *cognatus*.

Head slightly more pyramidal as seen in dorsal and cephalic aspects, in profile essentially the same as in *cognatus*, in dorsal aspect with breadth across the genae subequal to 1.2 times the dorsal length of the head (as 31 to 25); fastigium faintly more produced than in *cognatus*, rectangulate in outline, but with apex narrower, sharper, and less rounded than in *cognatus*, greatest breadth of fastigium subequal to twice its length cephalad of the eyes (as 33 to 17), disk of fastigium with but the faintest indications of lateral impressions, greatest interspace between eyes equal to nine-elevenths of the greatest fastigial breadth (as 27 to 33); fastigio-facial profile with its most advanced point between the antennal bases and not on the level of the paired ocelli, the more ventral section of the facial profile as in *cognatus*; frontal costa with its more dorsal section

³²⁹ This varies in paratypes to obtuse angulate.

narrower than in *cognatus*, reflecting the same condition noted in the male sex, the whole regularly and evenly, but not sinuately, broadening ventrad to the level of the median ocellus, its lateral borders and surface as in *cognatus*; lateral (supplementary) facial carinae somewhat more evident than in the female of *cognatus*, distinct but low; eyes as in female of *cognatus*. Antennae approximately 1.25 times as long as the median length of the pronotum (as 32 to 26), composed of 19 articles.

Pronotum as seen from the dorsum more evenly widening caudad and with less evidence of the substrangulation seen in *K. cognatus*, greatest breadth across lateral lobes somewhat less than 1.5 times the median length of the pronotal dorsum (as 40 to 27), greatest breadth across the lobes cephalad equal to nearly 1.2 times the median pronotal length (as 32 to 27) and four-fifths the greatest breadth caudad across the lobes (as 32 to 40); cephalic and caudal margins of disk as in the same sex of *cognatus*; dorsum of pronotum regularly widening caudad, the evenly diverging lateral carinae well elevated but becoming sub-obsolete very briefly before reaching the caudal margin, the carinae finely intersected by the second and third (principal) transverse sulci, median carina well marked and as evident as in *cognatus*, narrowly intersected only by the third (principal) transverse sulcus, metazona in proportions and in sculpture as in the same sex of *cognatus*; lateral lobes as in the latter.

Tegmina shorter than in the female of *cognatus*, narrowly surpassing the distal margin of the proximal abdominal segment.

Prosternal process, as in *cognatus*, broader and shorter than in the male sex, distinctly transverse, with the lateral angles of the otherwise subtruncate distal margin somewhat rounded. Interspace between mesosternal lobes as in the female of *cognatus* but meso-distal angles of lobes less rounded.

Sculpture of mesonotum and of more proximal abdominal tergites as in female of *cognatus*, the emphasis of the supplementary subcarinae less than in the male, yet well evident to a greater degree distad than in the same sex of *cognatus*, supra-anal plate narrower and more compressed trigonally than in the female of *cognatus*, its greatest proximal breadth but slightly more than six-sevenths of its median length (as 31 to 35), lateral margins except for a small median concavity evenly converging distad to the subobtuse apex, surface of supra-anal plate as in female of *cognatus*; cerci similar to but slightly more slender than in the female of *cognatus*, infra-cercal plates with distal margin arcuate as in *cognatus*; dorsal ovipositor valves as seen from dorsum more slender than in *cognatus*, dorsal margins as finely and as unevenly notched as in *cognatus*, ventral ovipositor valves and lateral plates as in *cognatus*; sub-genital plate with distal margin having a relatively broad, trigonal intervalvar production, while laterad, separated by a rounded but marked V-shaped emargination, the margin is produced into acute, rather narrow, trigonal processes, these nearly equalling the median one in length, surface of disto-ventral portion of plate deplanate.

Limbs showing no noteworthy structural differences from those of the female of *cognatus*.

Specimen	MEASUREMENTS (mm)						
	Length of Body	Length of Antenna	Length of Pronotum	Greatest Caudal Breadth Across Lateral Lobes of Pronotum	Length of Tegmen	Length of Caudal Femur	Greatest Depth of Caudal Femur
♂, 4 miles E. of Miena, Tas., <i>paratype</i>	17.6	5.2	3.4	3.7	3.4	11.8	3.0
♂, 4 miles E. of Miena, Tas., <i>paratype</i>	17.3	4.5	3.0	3.6	3.0	11.2	2.84
♂, 5 miles N. of Waddamana, Tas., <i>paratype</i>	17.5	4.7	3.3	3.7	3.1	11.8	2.52 ³⁴⁰
♂, 5 miles N. of Waddamana, Tas., <i>paratype</i>	19.7	4.7	3.4	3.6	3.1	12.1	3.1
♂, 1 mile ESE. of Wadda- mana, Tas., <i>paratype</i>	20.5	4.7	3.4	3.6	2.68	11.6	2.84
♂, 1 mile ESE. of Wadda- mana, Tas., <i>paratype</i>	17.3	4.5	3.1	3.4	3.0	11.3	2.68
♂, Lake Echo, Tas., <i>paratype</i>	18.1	4.8	3.4	3.7	3.0	11.6	3.0
♂, 6 miles ENE. of Derwent Bridge, Tas., <i>paratype</i>	17.6	4.8	3.4	3.6	3.4	11.8	3.0
♂, 6 miles ENE. of Derwent Bridge, Tas., <i>paratype</i>	16.7	5.0	3.4	3.6	3.3	11.0	2.84
♂, Victoria Valley, Tas., <i>type</i>	18.1	4.5	3.0	3.6	3.1	11.8	2.84
♂, Victoria Valley, Tas., <i>paratype</i>	17.0	4.5	3.1	3.6	3.3	11.8	2.84
♀, 4 miles E. of Miena, Tas., <i>paratype</i>	24.7	5.8	4.5	6.3	3.4	15.3	3.7
♀, 5 miles N. of Waddamana, Tas., <i>paratype</i>	23.8	4.8	4.4	5.8	3.6	15.0	3.3
♀, 1 mile ESE. of Wadda- mana, Tas., <i>paratype</i>	23.2	4.7	3.9	4.8 ³⁴¹	3.9	15.6	3.4
♀, 1 mile ESE. of Wadda- mana, Tas., <i>paratype</i>	25.9	4.7	4.1	6.1	3.7	16.9	3.4
♀, Lake Echo, Tas., <i>paratype</i>	23.2	4.7	4.2	6.0	3.6	15.0	3.6
♀, 6 miles ENE. of Derwent Bridge, Tas., <i>paratype</i>	20.0	— ³⁴²	3.7	5.2	3.4	13.8	3.0
♀, 6 miles ENE. of Derwent Bridge, Tas., <i>paratype</i>	24.1	5.2	4.5	6.1	4.1	15.6	3.6
♀, Victoria Valley, Tas., <i>paratype</i>	23.2	4.5	3.9	5.3	3.4	14.6	3.4
♀, Victoria Valley, Tas., <i>allotype</i>	28.8	5.0	3.9	6.0	4.2	15.3	3.7

The above figures show that there is a considerable range in size in material from the same locality, and also to a fair degree in certain relative proportions.

³⁴⁰ Femora somewhat shrivelled, material subteneral.

³⁴¹ Somewhat tenereal, and pronotum abnormally subcompressed.

³⁴² Accurate measurement not possible.

The ratio of breadth to length of the caudal femora, particularly in the female sex, shows a very appreciable degree of plasticity, and in material from the same locality.

Structural variation.—There is seen to be some variation in the degree of emphasis of the shallow impression of the fastigial disk on each side of the at most weakly indicated median carinulation. The angle of the outline of the fastigium as seen from the dorsum also varies somewhat, to as broad as a right angle in the male, and occasionally to slightly obtuse in the female. The pronotum in the male is very slightly longer proportionately and narrower in some specimens than in others, and this is found as an individual variation at several localities. There is some little variation in the exact degree of the curvature of the fastigio-facial angle as seen in profile—this principally in the female sex.

Coloration.—On the basis of the coloration of preserved material *tasmanicus* reverses the general tendency seen in the genus, in that no brown phase adult females are included, while in the male sex the ratio of green to brown adults is nearly balanced, i.e. 17 green to 19 brown. All of the 25 adult females before me are fully representative of the green phase. From only two of the localities represented by more than two specimens do the brown phase males outnumber the green phase ones, these being 5 miles N. of Waddamana (two green, eight brown) and 6 miles ENE. of Derwent Bridge (one green, five brown).

The two colour features which *tasmanicus* has in both colour phases and both sexes, and which can help in distinguishing it from *cognatus*, are the lack of any infuscation of the dorsum of the genicular extremity of the caudal femora or of the base of the caudal tibiae, and also in the caudal tibiae being more brownish, purplish, or olivaceous, and never truly glaucous.

Briefly the two colour phases, as found in the males, are as follows:

Green phase (from type): pattern in general as in the green phase male of *cognatus* but much more strongly contrasted, the base tone of virtually all of the head, pronotum, and dorsal surface of the caudal femora ranging from as pale as clear dull green yellow (of Ridgway) on the face, mouth-parts, and ventral sections of the genae, to as dark as cource green on the dorsum of the head and pronotum and more dorsal section of the lateral lobes of the pronotum, while the pale lateral occipital longitudinal bars (which are of variable emphasis), the lateral carinae of the pronotal dorsum, the subequally broad medio-longitudinal band on the abdominal dorsum, and the anal field of the tegmina range from ochraceous-buff to cinnamon, with the blackish fuscous areas on the lateral lobes of the pronotum and the broad, segmentally interrupted, longitudinal bars on the sides of the abdomen strongly marked; cream-coloured oblique post-ocular bar on each of the genae well marked, eyes bronzy, antennae sayal brown, pale proximad; pronotum with blackish fuscous areas on the lateral lobes as usual partially surrounded by contrasting cream-coloured subquadrate patches; tegmina with all except the anal field snuff brown; pale oblique lines on the pleura well marked; abdomen with the medio-longitudinal paler dorsal bar somewhat washed with olivaceous-green proximad, external genitalia of the

colour of the medio-dorsal bar; ventral surface isabelline, becoming honey yellow on the abdominal sternites and ventrad, bordering the dark longitudinal bars, on the sides of the tergites; cephalic and median limbs clay colour, caudal femora with external pagina washed with greenish with two cloudy fuscous patches dorsad in the proximal half, ventral sulcus nopal red, ventro-external lace lightly washed with pinkish.

Brown phase: much more contrasted than in the same phase of *K. cognatus*, its pattern elements essentially as in the green phase, but with the green tone replaced by tawny or cinnamon brown to fuscous, and with the pale elements on the head and pronotum cream colour, the dorsal face of the caudal femora, the pale median abdominal bar and most of the anal field of the tegmina tawny; face and mouth-parts lead grey finely sprinkled with mummy brown, eyes and antennae as in green phase males; tegmina with sutural marginal lining and marginal and discoidal fields mummy brown; cephalic and median limbs Saccardo's umber, caudal femora with external pagina largely mummy brown with a few pale clouds, ventral sulcus dull maroon.

In the female sex we have seen only the green phase, which shows the following noteworthy points:

Green phase (allotype).—As in male more brilliant and contrasted than in the green phase of *cognatus*, its pattern and tone as described for the green phase of the male sex with the following exceptions; the green base tone is more extensive and more solid, with its tone brighter and nearer apple green, not appreciably darkening dorsad and also involving the basal portion of the lateral aspects of the abdomen, evenly passing into the more distal subfuscous sections of these lateral bars, the pale medio-longitudinal dorsal bar on the abdomen clearly pencilled off from the more lateral sections by fuscous linings; limbs as in the green phase male.

A limited number of males are in an almost transitional position as regards their colour phase, but none are truly so. In these individuals the base green is very dull and almost olivaceous-green, but they more closely approximate the green phase than the brown one. Some of the representations show no tendency at all in this direction, but the total series of adults is too small to draw any broad conclusions.

Paratypes.—I am regarding all adult material of the species now before me as paratypic, full data for these being given in the appended section on "Specimens examined".

Remarks.—The colour relationship of *K. tasmanicus* to *K. cognatus* makes evident their relatively recent separation. It is now generally believed that Bass Strait was a land area during at least certain periods of the Pleistocene when oceanic levels were lower than at present. However, this land connexion is also considered to have existed in periods prior to the Pleistocene, and it is possible that *Koscinscola* may have been established in Tasmania at an earlier period. The late Sir Edgeworth David, the distinguished geologist of Australia, has stated concerning Bass Strait: "the strait was formed in pre-Pleistocene time, since there are Pleistocene terraces along its shores; also it is post-Miocene

since Tasmania was continuous with the mainland during the formation of the Miocene peneplain."³⁴³ The particularly interesting fact is that the closest relative of *tasmanicus* on the Australian mainland, i.e. *cognatus*, is the one of the four lines of the genus which does not reach the highest elevations in the Australian mountains, hence presumably cannot endure as low temperatures or as rigorous conditions as the other stocks. Further it apparently does not occur in the Victorian highlands. Whether these points indicate a somewhat different earlier history remains to be determined.

Distribution.—Available material would indicate that *K. tasmanicus* is limited to the elevated central area of Tasmania, probably not found below the 2000-ft contour. Apparently the lowest point represented by the material before me is Victoria Valley, which is at approximately 2000-ft elevation; Great Lake, also represented, is at 3380 ft, while a number of the other points are at elevations between 3000 and 4000 ft. Whether *tasmanicus* occurs to the westward of the localities listed below remains to be determined. The area of distribution of *tasmanicus* is largely over territory which was covered by Pleistocene glaciation.³⁴⁴ Adult material is before me from January dates ranging from the 13th to the 30th, and also was taken as late as March 30. Immature individuals were present with adults on January 13, 28, and 30.

Specimens examined.—81; 37 ♂, 25 ♀, 8 juv. ♂, 11 juv. ♀.

Tasmania.—1 mile SW. of Breona, Great Lake; 13.i.1948 (Key, Carne, and Kerr), 2 juv. ♂, 1 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Great Lake, Mar. 1950 (G. B. Sharman) 1 ♂, 1 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra). 2 miles E. of Miena; 26.i.1948 (Key, Carne, and Kerr) 1 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 4 miles E. of Miena; 26.i.1948 (Key, Carne, and Kerr) 2 ♂, 1 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 5 miles N. of Waddamana; 26.i.1948 (Key, Carne, and Kerr) 10 ♂, 1 ♀ (*paratypes*) (Division of Entomology, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 1 mile ESE. of Waddamana; 26.i.1948 (Key, Carne, and Kerr) 6 ♂, 8 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 4 miles W. of Bronte; 30.i.1948 (Key, Carne, and Kerr) 4 ♂ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Lake Echo; 30.iii.1952 (J. H. Calaby) 1 ♂, 1 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra). 11 miles NNE. of Bronte; 13.i.1948 (Key, Carne, and Kerr) 2 ♂ (*paratypes*), 5 juv. ♂, 5 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 1 mile S. of Bronte; 13.i.1948 (Key, Carne, and Kerr) 1 juv. ♂, 2 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 6 miles ESE. of Der-

³⁴³ "The Geology of the Commonwealth of Australia," II: 118 (1950).

³⁴⁴ See Edgeworth David, "Geology of the Commonwealth of Australia," I: 624, Fig. 188 (1950).

went Bridge; 30.i.1948 (Key, Carne, and Kerr) 6 ♂, 5 ♀ (*paratypes*) 1 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 2 miles WSW. of Derwent Bridge; 28.i.1948 (Key, Carne, and Kerr) 1 ♂ (*paratype*), 1 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Victoria Valley; 30.i.1948 (Key, Carne, and Kerr) 4 ♂ (*type* and *paratypes*) 8 ♀ (*allotype* and *paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia).

*KOSCIUSCOLA USITATUS*³⁴⁵ n. sp.

Plate 20, Fig. 212; Plate 21, Figs. 211, 216, and 217; Plate 28, Figs. 376-388

Kosciuscola sp[ecies] 2 Key and Day (1954), Aust. J. Zool. 2: 312 (Kosciusko Massif, New South Wales).

This species in general appearance is very similar to *Kosciuscola cognatus*, which also occurs in the same areas, and even in the same environments as *K. usitatus*. The two species have the same general type of prosternal process, which with most of the other species of the genus is a convenient differential feature. In the female sexes of *usitatus* and *cognatus* the chief structural features for their separation are that the dorsal ovipositor valves in *usitatus* are distinctly more slender than in *cognatus*, while the ventral pair of these appendages in *usitatus* is also more slender distad, and their ventro-external margin has a well-marked proximal tooth, forming a virtually peg-like structure, a condition not as definitely indicated in *cognatus*, while the female subgenital plate has its distal margin simpler than in *usitatus*, this area without the marked infra-valvar concavities and the lateral triangular nodes seen in *cognatus*. In the male sex *usitatus* can readily be separated from *cognatus* by its broad, shallow, and rim-like, rather than roundly lobate furcula, by the supra-anal plate being even more strongly transverse scutellate, with its apical lobation more rounded and less angulate, while the surface of the lateral sections of the plate bears short pronounced transverse carinations, which occupy a good part of each lateral section of the plate, and are accentuated proximad and distad by relatively deep excavations of the surface. In the male sex of *cognatus* these carinae are not present, and the plate is not deeply excavate in this fashion. The cerci of the male are more elongate than in *usitatus*, with the distal section very distinctly aciculate.

Aside from the above features *usitatus* averages slightly more robust than *cognatus*, the male has the cephalic and median femora more inflated, while the caudal femora in both sexes are not definitely infusate on the dorsum of the genicular extremity, a condition found in *cognatus*, and the head in both sexes lacks pale post-ocular bars, which are well marked in *cognatus*.

Type.—♂; Mt. Gingera, Australian Capital Territory. 6092 ft elevation. March 8, 1944 (Key and Pryor) (Division of Entomology Museum, C.S.I.R.O., Canberra).

³⁴⁵ i.e. *usual*, on account of its broader distribution, as contrasted with those of some members of the genus.

Owing to the great similarity of this species to *K. cognatus* the descriptions of it are comparative with those of the respective sexes of *cognatus* given on preceding pages.

Form more robust and somewhat less compressed than in *cognatus*; surface similar.

Head somewhat heavier than in *cognatus*, otherwise in general very similar, breadth across genae, as seen from the dorsum, contained 1.25 times in the dorsal length of the head; fastigium as seen from dorsum somewhat broader and blunter than in *cognatus*, its greatest breadth equal to 2.5 times its length cephalad of the eyes (as 25 to 10), lateral borders of fastigium as viewed from dorsum forming a right angle with the apex as in *cognatus*, greatest interspace between eyes proportionately as in *cognatus*, fastigial disk impressed as in the latter species; fastigio-facial angle as seen in profile almost as in *cognatus*, but with inter-antennal section of facial line slightly more produced and more broadly arcuate; frontal costa laterad more clearly defined ventrad of the median ocellus and except for the dorsal narrowing as a whole broader than in *cognatus*, surface of costa weakly impressed about and ventrad of median ocellus, but in no way sulcate, surface punctations much as in *cognatus*, no definite bordering carinae present, although these margins are more clearly defined than in *cognatus*; lateral supplementary carinae of face much more distinct than in *cognatus*; eyes seen from the dorsum as in *cognatus*, basal outline slightly narrower than in *cognatus*, its greatest breadth but five-sevenths of its greatest depth (as 10 to 14), the whole dorso-caudal section of the outline less broadly arcuate than in *cognatus*. Antennae equal to 1.75 times the median length of the pronotal dorsum (as 60 to 34), composed of 19 articles.

Pronotum essentially as in *cognatus* but median strangulation slightly more evident, while the greatest breadth across the lateral lobes caudad is somewhat less proportionate to the median pronotal length, being slightly less than 1.1 times the latter (as 37 to 34); cephalic margin of disk very slightly and shallowly subangulate emarginate, caudal margin as in *cognatus*, but with the converging arms rather more arcuate, dorsum of pronotum much as in *cognatus* but less sharply clepsydral, with the lateral carinae more evenly inbowed and in structure somewhat more evident, the median one more decided than in *cognatus*; lateral lobes as in *cognatus* but ventral margin with its median angle slightly sharper, the caudal margin slightly more concave ventrad, and the metazonal section of the surface proportionately somewhat wider.

Tegmina with their proportionate length as in *cognatus*, as a whole more broadly spatulate, their greatest breadth contained 2.2 times in their length (as 32 to 71), apex sharply rectangulate, anal vein as in *cognatus*, marginal field somewhat broader proportionately.

Prosternal process as in *K. cognatus* but somewhat narrower, with the distal margin subtruncate with a weak median micro-emargination, and its disto-lateral angles narrowly rounded. Interspace between mesosternal lobes narrower than in *cognatus*, appreciably longitudinal, but two-fifths as broad as one of the mesosternal lobes; metasternal lobes as in *cognatus*.

Metanotum with but weak indications of lateral subcarinae paralleling the median carina, these completely lacking on the abdominal tergites; ultimate tergite with the furcula developed as broad but very narrow shelf-like rims to the tergite, these reaching laterad slightly more than half-way to the proximo-lateral bases of the supra-anal plate, the sections of the furcula in contact on the median line, their free margin straight oblique, narrowly truncate disto-laterad, and their surface separated from that of the body of the tergite by a low ridge of the surface; supra-anal plate scutellate, moderately transverse, its greatest breadth at the base nearly 1.4 times its median length (as 37 to 27), the outline of its free margins much resembling that of *K. cognatus*, but the lateral sections more sharply converge to the more emphasized and subacute apex, surface of plate with a narrow median sulcation in the proximal third, the median more distal section broadly arcuate transversely, while the more lateral sections of the surface are sinuately well-excavate proximad, mesad, and distad of a short, subtransverse, and elevated but rounded cariniform elevation; cerci straight, styliform, and acuminate, surpassing the apex of the supra-anal plate by a distance nearly equal to half the length of the whole of the latter plate, internal face with a low node at distal third, apex of cerci sharply acuminate; subgenital plate slightly more produced than in *K. cognatus*, subrostrate as seen in profile, as viewed from the dorsum the dorsal margins converge distad at an angle slightly more acute than a right angle, when compared with *K. cognatus* the plate is somewhat deeper in profile and its caudal angle is distinctly more oblique.

Cephalic and median femora appreciably more inflated than in *K. cognatus*, and as viewed in both dorsal and lateral aspects. Caudal femora very similar to those of the same sex of *cognatus*; caudal tibiae slightly more robust distad, particularly when viewed from the dorsum, external margin with 12-13, internal with 11-12 spines.

Allotype.—♀; same data as type (Division of Entomology Museum, C.S.I.R.O., Canberra).

As already mentioned the following features are those of noteworthy difference from the same sex of *K. cognatus*.

Form slightly more robust, most evident in thoracic breadth; surface slightly more glabrous than in the female of *cognatus*.

Head slightly heavier as seen in cephalic aspect, greatest breadth across genae equal to about 1.3 times the dorsal length of the head (as 33 to 25); fastigium as seen from dorsum with its form, as in the male, broader and blunter than in *cognatus*, its greatest breadth equal to somewhat more than 2.5 times its length cephalad of the eyes (as 36 to 14), lateral borders of fastigium as viewed from dorsum forming an obtuse angle with the apex as in *cognatus*, greatest interspace between the eyes equal to five-sixths of the greatest breadth of the fastigium (as 30 to 36), fastigial disk with impressions weaker than in male; fastigio-facial angle as seen in profile slightly more rounded than in the female of *cognatus*, frontal costa much as *cognatus*, but with its lateral borders more evident and elevated, although not carinate, and definite ventrad to the supra-clypeal surface

of sulcus with the same type of impression noted for the male sex; lateral supplementary carinae, as in the male sex, more evident than in *cognatus* but not strongly developed; eyes as in the male sex except that the greatest breadth of the basal outline is nearly equal to three-fourths of the greatest length of that outline (as 31 to 43). Antennae equal to slightly more than 1.5 times the median length of the pronotum (as 64 to 42).

Pronotum in general very similar to that of the female of *K. cognatus*, except that it is slightly broader caudad, the strangulate tendency as in the female of *cognatus*, greatest breadth across lateral lobes caudad equal to about 1.35 times the median pronotal length (as 63 to 47); cephalic margin of disk transverse truncate, caudal margin with its general outline as in the same sex of *cognatus*; dorsum of pronotum with its general pattern and carinal development as in the female of *cognatus* but the lateral carinae diverge more widely caudad and in structure they are somewhat thicker and more strumose, also less evident on the metazona; lateral lobes essentially as in the female of *cognatus*.

Tegmina as in the same sex of *cognatus*.

Prosternal process quadrate in outline, its distal margin transverse truncate,³⁴⁶ with its disto-lateral angles sharper and not rounded to the extent they are in the male. Interspace between mesosternal lobes slightly transverse quadrate, its breadth equal to four-fifths of that of one of the lobes; metasternal lobes as narrowly separated as in the female of *cognatus*.

Metanotum and more proximal abdominal tergites lacking definite indications of lateral subcarinae of the type seen in the female of *cognatus*, and weakly indicated in the male of the present species; supra-anal plate similar to that of the female of *cognatus* but slightly more longitudinal and proportionately narrower, the greatest proximal width being but slightly greater than its median length (as 36 to 35), the apex more sublinguiform, its surface with a shallow median sulcation in proximal half, the more distal section, as in *cognatus*, punctate; cerci simple, styliform, tapering, slightly longer than in *cognatus*; dorsal ovipositor valves more slender than in *cognatus*, their distal outline as seen from the dorsum much sharper, ventral valves as seen from venter distinctly more attenuate distad, their external border with a distinct elevated lamellate shoulder or peg-like process,³⁴⁷ distal section of ventral valves somewhat more subfalciform as seen in profile; subgenital plate with its distal margin as a whole subtruncate, and mesad lacking the subtrigonal produced area seen in *cognatus*, the infra-valvar sections evenly and shallowly concave-emarginate, while the disto-lateral angles are not at all produced, ventral surface of plate shallowly concave distad; lateral plates very similar to, but slightly shallower than in, *cognatus*.

Cephalic, median, and caudal femora as in the same sex of *cognatus*; caudal tibiae with 12 external and 11-12 internal spines.

³⁴⁶ This margin individually varies within the species to an extreme in which it is distinctly emarginate mesad. This is especially evident in a male from Mt. Gingera.

³⁴⁷ A similar development is found in *cognatus*, but of a much less evident category, and lacking the pronounced lamellation seen in *usitatus*.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Greatest Caudal Breadth Across Lateral Lobes of Pronotum	Length of Tegmen	Length of Caudal Femur	Greatest Depth of Caudal Femur
♂, Saddle between Stockyard Creek and Snowy Flat, c. 5500 ft, A.C.T., <i>para- type</i>	18.0	— ³⁴⁵	3.6	3.9	3.3	12.3	3.1
♂, Saddle between Stockyard Creek and Snowy Flat, c. 5500 ft, A.C.T., <i>para- type</i>	18.4	6.0	3.3	3.9	3.1	12.1	3.0
♂, Mt. Gingera, 6092 ft, A.C.T., <i>paratype</i>	15.9	— ³⁴⁹	3.3	3.4	3.1	11.2	2.84
♂, Mt. Gingera, 6092 ft, A.C.T., <i>type</i>	20.2	6.0	3.4	3.7	3.7	11.8	3.0
♂, 2 miles SW. of Charlotte Pass, 6065-6292 ft, N.S.W.	16.8	— ³⁴⁸	3.3	3.4	3.1	11.2	2.84
♂, 2 miles SW. of Charlotte Pass, 6065-6292 ft, N.S.W.	18.7	5.6	3.4	3.7	3.4	11.6	3.0
♂, Mt. Kosciusko, 6200 ft, N.S.W.	17.6	5.0	3.3	3.9	3.6	11.6	3.1
♂, Mt. Kosciusko, 6200 ft, N.S.W.	18.0	5.0	3.4	4.1	3.6	11.5	3.0
♂, Mt. Kosciusko, 6850-7328 ft, N.S.W.	16.2 ³⁵⁰	4.4	2.84	3.4	2.52	10.5	2.65
♂, Mt. Kosciusko, 6850-7328 ft, N.S.W.	17.6	5.0	3.6	3.7	3.4	11.2	3.0
♂, Mt. Kosciusko, summit, 7300 ft, N.S.W.	16.1	4.7	3.1	4.2	2.84	11.3	3.0
♂, Mt. Kosciusko, summit, 7300 ft, N.S.W.	20.8	5.2	3.4	4.1	3.0	11.5	3.3
♂, Mt. Feathertop, Vic.	16.1	4.4	3.1	3.4	2.52	10.2	2.68
♂, Mt. Feathertop, Vic.	18.6	4.5	3.1	3.4	3.3	10.7	2.84
♂, Mt. Hotham, 6100 ft, Vic.	15.0	— ³⁵¹	2.84	3.6	3.0	10.4	2.52
♂, Mt. Hotham, 6100 ft, Vic.	16.0	— ³⁵¹	3.3	3.8	3.1	10.7	2.84
♂, Mt. Gingera, 6092 ft, A.C.T., <i>paratype</i>	21.7	5.5	3.7	4.8	3.7	13.8	3.0
♀, Mt. Gingera, 6092 ft, A.C.T., <i>allotype</i>	28.4	6.4	4.2	5.8	3.6	15.7	3.4
♀, Mt. Gingera, 6092 ft, A.C.T., <i>paratype</i>	32.3 ³⁵²	— ³⁴⁵	4.7	6.3	5.0	18.0	3.9
♀, 2 miles SW. of Charlotte Pass, 6065-6292 ft, Kos- ciusko Massif, N.S.W.	27.7	6.0	3.7	6.3	4.2	15.3	3.7
♀, Mt. Kosciusko, 6200 ft, N.S.W.	21.0	5.5	3.7	5.2	3.1	12.7	3.1

MEASUREMENTS (mm) (Continued)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Greatest Caudal Breadth Across Lateral Lobes of Pronotum	Length of Tegmen	Length of Caudal Femur	Greatest Depth of Caudal Femur
♀, Mt. Kosciusko, 6200 ft, N.S.W.	26.1	5.6	3.9	5.5	3.9	14.2	3.4
♀, Mt. Kosciusko, 6850-7326 ft, N.S.W.	22.1	5.0	3.7	5.5	3.4	13.4	3.4
♀, Mt. Kosciusko, 6850-7326 ft, N.S.W.	24.3	5.2	4.1	5.8	4.1	14.5	3.4
♀, Mt. Kosciusko, summit, 7300 ft, N.S.W.	24.1	5.0	4.1	5.8	3.9	14.2	3.6
♀, Mt. Kosciusko, summit, 7300 ft, N.S.W.	26.8	4.8	3.9	6.0	4.1	14.8	3.6
♀, Mt. Feathertop, Vic.	21.7 ³⁵⁰	5.3	4.2	5.5	3.6	14.5	3.4
♀, Mt. Feathertop, Vic.	24.1	5.5	4.1	5.5	4.1	13.7	3.3
♀, Mt. Hotham, 6100 ft, Vic.	19.2	— ³⁵¹	3.6	5.2	3.0	12.9	3.1
♀, Mt. Hotham, 6100 ft, Vic.	26.9	5.3	4.5	6.4	4.7	15.4	3.7

The above measurements show that at certain of the localities represented *usitatus* exhibits a marked size range in both sexes. The representation from the Victoria highlands, i.e. Mt. Feathertop and Mt. Hotham, averages smaller than that from the mountains of the Australian Capital Territory. The series from localities on the Kosciusko Massif show a great diversity in size, with that from the summit of Mt. Kosciusko (7300 ft) little different in average size from individuals taken 1000 ft or so lower down. The great size plasticity of the Kosciusko Massif representation may be due to localized ecological features and immediate environmental conditions serving as size controlling factors. Further, the mountains of the Australian Capital Territory and the Kosciusko Massif represent the centre of optimum differentiation in this genus, and thus favourable influences may be responsible for the average greater size, when compared with what we see in the series from the Victorian highlands.

Structural variation.—Aside from the condition found in certain males, which is discussed on a following page under "Remarks", the noteworthy features of individual structural variation in this species appear to be the following. The exact angle of the fastigial outline, as seen from the dorsum, ranges in the male from the right angle seen in the type to an opposite condition in which it is definitely more obtuse; in the female the same variation is found as in the male, but extending to a relatively broader obtuse-angulation. In the female the

³⁴⁸ Lacking.

³⁴⁹ Incomplete.

³⁵⁰ Abdomen somewhat telescoped.

³⁵¹ Too contorted to measure.

³⁵² Abdomen somewhat over extended.

pronotum exhibits considerable plasticity in the extent to which it is expanded caudad, and among those least expanded frequently in the degree to which a moderate median strangulation of the pronotum is indicated, these tendencies being purely individual and often represented in the same series. In the male the tegmina vary appreciably in length, from an extreme in which they reach only to the distal margin of the proximal abdominal tergite, to an opposite one in which they extend to the middle of the second tergite, as in the type, in all, however, with the disto-sutural angle remaining relatively sharp; in the female we find virtually the same range, and, as in the male, in material from the same locality. In the male sex there is some little variation in the exact degree of production of the apex of the supra-anal plate, and this regardless of locality with the extremes in the same series.

Material from the higher levels of Mt. Kosciusko (i.e. above about 6000 ft) averages somewhat more robust than individuals from the Australian Capital Territory or those from the Victorian highlands, but this is not constant enough, nor sufficiently decided, to be regarded as more than a trend, such as is frequently found locally in alpine forms, and which in most cases is probably due to very local environmental factors.

Coloration.—Key and Day in their recent study of colour response to temperature in *Kosciuscola* have pointed out that this species—their “K. sp. 2”—showed certain colour responses³⁵³ analogous to those of the same body areas in *K. tristis*. Their comments are: “At 4°C the face was darker, the portion above the clypeus being brown in the male. Mesometasternum brown to very dark brown, pale along the sutures and posterior margin. Abdomen brownish to dark brown, the posterior margins of the sternites pale. At 35°C the face was paler, and often greener above the clypeus. Mesometasternum pale bluish green to pale greenish buff, darker along the sutures. Abdomen pale buff or pale gray, sometimes with a greenish tinge, anterior margins of the sternites dark.” The comments on coloration here given have of necessity been drawn from preserved material and are comparative with *K. cognatus*, to which, in coloration, such material of this species is much more similar than it is to *K. tristis*. In the male sex the green phase is present in some of the series before me. In the female this phase is indicated but not as clearly as in *K. cognatus*, and often is darker and always less vivid. In the male sex the pattern is essentially as described for *cognatus* with the following exceptions: head lacking any marked indication of pale post-ocular bars and generally there is more evidence of occipital caudad-diverging tawny to russet paler bars; the tegmina have the anal area paler and more contrasted, nearer rufous, with the remainder mummy brown to fuscous; the abdomen and the limbs are essentially as in *cognatus* except that the dorsal section of the genicular extremity and the genicular lobes and arches of the caudal femora are not infuscate. In the female sex the differences are much as noted for the male sex except that the paler occipital bars are usually carried over the pronotal dorsum and internally border the lateral

³⁵³ Aust. J. Zool. 2: 350 (1954).

shoulders of the disk, and the two elements of the tegminal coloration are usually, but not invariably, less contrasted and the marginal and discoidal fields are not as dark in tone, in fact as relatively pale sometimes as dresden brown. The dorsum of the abdomen but infrequently has the median pale longitudinal area as evident or as decided as it usually is in *cognatus*, and as a whole this insect is duller, less contrasted, and in consequence less conspicuous in coloration than *cognatus*.

This species shares with *cognatus* the occasional possession of fuscous black colouring in the area immediately surrounding the antennal bases. In some lots this is seen in but a few specimens, in others, as those from or near the summit of Mt. Kosciusko, representatives in this condition greatly predominate, and it is also seen in part of the Mt. Hotham, Vic., representation (i.e. 1 ♂, 6 ♀).

Definitely green phase males are before me from the saddle between Stockyard Creek and Snowy Flat, A.C.T. (all 3 males), and Mt. Gingera (6 ♂). Numerous others are tinged with greenish, but would be considered nearer a brown phase. The general base tone of the head, pronotum, and dorso-external face of the caudal femora is largely jade green in the green phase males, with the lateral sections of the pale medio-dorsal abdominal bar olive-ochre darkened to buffy-olive mesad. In the female sex green base colour ranges from jade green to as pale as rainette green, with the pattern very much as in *cognatus* except for the differences above mentioned. Immature individuals exhibit both green and brown phase tendencies. The type is a green phase male, the allotype is in an intermediate condition with the lateral lobes of the pronotum and the disk of the same nearer the green type, while the head and dorso-external face of the caudal femora show some approach in that direction. The series from 6200 ft on Mt. Kosciusko is almost entirely pronounced brown phase, those from the summit quite dark but with a greenish tendency. The Mt. Gingera, A.C.T., and Mt. Hotham, Vic., females are largely greenish, or at least show tendencies that way.

Paratypes.—I have selected as paratypes three males from the saddle between Stockyard Creek and Snowy Flat, A.C.T., taken March 8, 1944, by Key and Pryor, and 17 males and 19 females from the type locality, and bearing the same data as the type and allotype.

Remarks.—As with *Kosciuscola cognatus* a few male specimens of the series of this species show aberrational tendencies in their external genitalia, a matter which has been discussed under this head for *K. cognatus*. A possible explanation of these tendencies has been presented adequately under the latter species, and the conditions here seen are largely parallel to what has already been noted. Four specimens are involved, a single male each from Mt. Hotham, Vic., and Mt. Gingera, A.C.T., and two of the three males from Charlotte Pass, Kosciusko Massif, N.S.W. The general build is essentially the same as in normal males except that there is a slightly greater robustness and the fastigium is slightly blunter than in the average male. The tegmina are slightly shorter than average in all four except that from Mt. Hotham in which they are in the usual ratio, i.e. but slightly shorter than the pronotum. In one of the Charlotte Pass

individuals they are of somewhat different individual length. The cephalic and median femora show the normal amount of inflation for the sex in all four except one of the Charlotte Pass specimens, in which they more nearly approximate the build in the average female. The supra-anal plate in the four shows an even passage in its outline and sculpture from near the normal shape for the male, and a moderate emphasis of the lateral transverse sculptural carinae, to an opposite extreme in which the plate is subtrigonal in outline, with its apex but weakly marked off from the evenly arcuate converging lateral margins, while the rudiments of the lateral transverse sculptural carinae are brief, very low, and virtually subobsolete bosses. The most divergent from the mean of the species in the form and sculpture of the supra-anal plate is the Mt. Gingera individual, which is here figured (Plate 28, Fig. 388), the divergences less marked in one of the Charlotte Pass males, and decreasingly indicated in the second Charlotte Pass individual and that from Mt. Hotham, which latter differs from the norm chiefly in a more trigonal tendency in the plate outline, the sculpture on it being nearly the same as in normal Mt. Gingera male individuals. In the Mt. Hotham male the cerci are of essentially normal type for the species, but in the more divergent ones they are more styliform, more acuminate, and with the internal tooth subobsolete to not at all indicated (in one from Charlotte Pass). The subgenital plate shows no noteworthy divergence from the norm of the species. In any consideration of morphological conditions such as here noted, involving forms of high or relatively high montane areas, due weight must be given to the brevity of their life cycle, and the consequent severity of conditions under which they live, involving as these do almost every element of the fauna and flora. Field work done by the author at high altitudes in North America has made evident to him that existence pressure there is clearly reflected in numerous series of Orthoptera from these areas already collected, but yet to be evaluated.

Distribution.—Elevated areas of the Australian Capital Territory, the Kosciusko Massif of New South Wales, and at least a portion of the higher elevations of the eastern highlands of Victoria. Key and Day³⁵⁴ state that this species—their "*Kosciuscola* sp. 2"—is found with *K. tristis* on the upper slopes and summit of Mt. Kosciusko. Information drawn from the specimens now before me indicates its occurrence on the Kosciusko Massif of New South Wales from as low as 5085 ft to the summit of Mt. Kosciusko (7328 ft). From the mountains of the Australian Capital Territory it is represented by material taken at approximately 5500 ft (saddle between Stockyard Creek and Snowy Flat) and 6100 ft on Mt. Gingera. In the Victorian highlands it is known from Mt. Feathertop at an unstated elevation, and from 6100 ft on Mt. Hotham. It is thus evident that in latitude its distribution covers the known mainland range of the genus except for Mt. Buffalo in Victoria (where *K. tristis restrictus* alone occurs).

Adults of this species are before me from a variety of dates extending from

³⁵⁴ Aust. J. Zool. 2: 312 (1954).

January (specifically 28-30, and from near the summit of Mt. Kosciusko) to April 18 (from the same summit and from Hotel Kosciusko). Immature individuals represent dates between February 22 (Mt. Feathertop) and March 5 (several stations on Mt. Kosciusko), and also November 17, from the top of Mt. Kosciusko.

Specimens examined.—167; 81 ♂, 76 ♀, 2 juv. ♂, 8 juv. ♀.

Australian Capital Territory.—Saddle between Stockyard Creek and Snowy Flat, 5500 ± 100 ft; 8.iii.1914 (Key and Pryor) 3 ♂ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Mt. Gingera, 6092 ft; 8.iii.1944 (Key and Pryor) 19 ♂ (including *type* and *paratypes*) 20 ♀ (*allotype* and *paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia).

New South Wales.—No exact locality; 10.iii. 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Kosciusko Massif; Jan. 1946 (L. R. Clark) 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Hotel Kosciusko, [Kosciusko Massif], 5300 ft; 18.iv.1937 (K. H. L. Key) 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 0-5 miles SW. of Hotel Kosciusko, 5086 ft; 6.iii.1916 (K. H. L. Key) 2 ♂, 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 4 miles SW. of Hotel Kosciusko, 5360-5508 ft; 6.iii.1946 (K. H. L. Key) 2 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Charlotte Pass, Kosciusko Massif, 6039 ft; 5.iii.1946 (K. H. L. Key) 2 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia); 9.ii.1946 (D. F. Waterhouse) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 2 miles SW. of Charlotte Pass, Kosciusko Massif, 6065-6292 ft; 5.iii.1946 (K. H. L. Key) 7 ♂, 2 ♀, 1 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 3 miles E. of Charlotte Pass, Kosciusko Massif, 5678-5850 ft; 6.iii.1946 (K. H. L. Key) 4 ♂, 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Near Seaman's Hut, Mt. Kosciusko; 9.ii.1946 (D. F. Waterhouse) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Near summit, Mt. Kosciusko, 6200 ft; 28-30.i.1939 (A. J. Nicholson) 7 ♂, 13 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 2 miles E. of Mt. Kosciusko, 6135-6617 ft; 5.iii.1946 (K. H. L. Key) 5 ♂, 3 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Mt. Kosciusko, 7328-6850 ft; 5.iii.1946 (K. H. L. Key) 10 ♂, 7 ♀, 1 juv. ♂, 1 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Lake Cootapatamba, Mt. Kosciusko, 6788-6850 ft; 5.iii.1946 (K. H. L. Key) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Mt. Kosciusko, 7000-7328 ft; 5.iii.1946 (K. H. L. Key) 2 ♂, 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Summit, Mt. Kosciusko; 20.iii.1938 1 ♀ (Division of Entomology Museum, C.S.I.R.O.,

Canberra). Top of mountain, [Mt.] Kosciusko; 17.xi.1938 (A. L. Tonnoir) 1 juv. ♂, 1 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Summit, Mt. Kosciusko, 7300 ft; 18.iv.1937 (K. H. L. Key) 6 ♂, 9 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia).

Victoria.—Mt. Feathertop; 22.ii.1947 (Key and Carne) 5 ♂, 3 ♀, 3 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Mt. Hotham, 6100 ft; 23.ii.1947 (Key, Carne, and Rothery) 4 ♂, 7 ♀, 2 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia).

KOSCIUSCOLA CUNEATUS³⁵⁵ n. sp.

Plate 20, Fig. 213; Plate 21, Figs. 215, 218, and 219; Plate 28, Figs. 389-392; Plate 29, Figs. 393-402

This very strongly marked species stands well apart from the other members of the genus, but I do not feel warranted in separating it generically or subgenerically. However, the very distinctive cuneate prosternal process, with its briefly divided apex, will at once distinguish *cuneatus* from the other members of the genus, accompanied as this is by a number of other more relative features, which have been given in the preceding key to the forms of the genus. The rather less conical head and the strongly bicoloured tegminal pattern are the more obvious of these relative criteria.

Type.—♂; Lee's Spring, Australian Capital Territory.³⁵⁶ March 3, 1938 (K. H. L. Key) (Division of Entomology Museum, C.S.I.R.O., Canberra).

Form as a whole less robust than in *K. tristis*, but not as subfusiform as in the same sex of *K. cognatus*, caudal femora much more slender than in *tristis*, their build much as in *cognatus* and *usitatus*; surface much as in other species of the genus but metazona of the disk of the pronotum not impresso-punctulate.

Head as seen in cephalic aspect with the genae less definitely narrowing dorsad than in related species, in profile the occipital outline is more arcuate than in *cognatus* and essentially as in *tristis*; fastigium as seen from the dorsum with general form more as in *usitatus* than in the other species but narrower, its greatest length cephalad of the eye margins being but half of the greatest breadth of the fastigium (as 12 to 24), the margins forming an angle slightly more obtuse than a right angle, and with the immediate angle more narrowly rounded than in any of the other species of the genus, surface of disk as a whole definitely but not deeply excavate, this extending caudad well through the interocular space, which latter is relatively narrow, subequal to three-fifths of the greatest fastigial breadth (as 15 to 24), the subcarinate fastigial margins well indicated through the interocular space; fastigio-facial angle as seen in profile much resembling that of *tristis*, but slightly less broadly rounded although the outline of the fastigial dorsum is slightly more declivent; facial profile rather strongly oblique,

³⁵⁵ In allusion to its wedge-shaped prosternal process.

³⁵⁶ See Vol. II, p. 38 footnote 66.

in this respect equal to *K. cognatus*, the whole nearly straight dorsad and somewhat convex ventrad, in this also virtually as in *cognatus*; frontal costa narrower than in the other species, the margins, which are not strongly carinate, moderately diverging from the narrow fastigio-facial angle to the interantennal area, thence subparallel to the ventral third of the face, where they moderately diverge ventrad and become subobsolete, sulcus coarsely and irregularly impressed, but not a rounded grooving; lateral facial carinae well marked and moderately diverging; eyes as seen in cephalic aspect somewhat more prominent dorsad and laterad than in the other species of the genus, basal outline as seen in profile broad ovate, flattened on cephalic side, greatest breadth equal to eleven-fourteenths of the depth (as 33 to 42). Antennae about 1.8 times³⁵⁷ as long as the pronotal disk, composed of 20 articles, those distad somewhat shorter proportionately, apex rather blunt.

Pronotum somewhat more longitudinal than in the other species of the genus, as a whole more compressed and subsellate, although the dorsal line in profile is straight and not at all concave, greatest breadth of pronotum across ventral portion of lateral lobes caudad equal to the median length of the disk,³⁵⁸ greatest caudal breadth of the pronotal disk subequal to median length of the disk, while the least breadth of the disk, which is at the first transverse sulcus, is but two-thirds of that at the caudal margin (as 13 to 19); cephalic margin of disk low arcuate, caudal margin of disk very shallowly and very broadly emarginate; median carina well marked, somewhat lower cephalad than elsewhere, distinctly intersected solely by the principal sulcus, lateral shoulders of disk distinct but low subcariniform, as seen from dorsum moderately clypsedral, lightly converging to the first transverse sulci and evenly diverging thence caudad, transverse sulci well impressed, particularly the principal one, which is at the caudal third, surface of metazonal dorsum not appreciably cribose impresso-punctulate; lateral lobes of pronotum more longitudinal than in the other species of the genus, their greatest depth being equal to five-sevenths of the dorsal length of the lobes (as 50 to 70), the outline in its details being essentially as in *K. cognatus*.

Tegmina faintly surpassing the distal margin of the proximal abdominal tergite, broadly spatulate, very narrow at base, the greatest breadth, which is at distal third, equal to half the tegminal length; costal margin broadly arcuate, passing into the subtruncate distal margin, which latter passes by the narrowly rounded subrectangulate disto-sutural angle into the nearly straight sutural margin; surface of the discoidal area rugulosely impresso-punctate with little indication of longitudinal venation except a distinct discoidal vein mesad in the area, while distad there is an indication of several oblique cross-veins in direction subparallel to the distal margin, anal vein well marked, as seen from

³⁵⁷ This ratio varies individually, as will be seen by reference to the accompanying table of measurements (pp. 264-5).

³⁵⁸ For data on the individual variation of this ratio in the present representation, see the accompanying table of measurements (pp. 264-5).

the dorsum appreciably convex, anal field closely and cribrately impresso-punctulate.

Prosternal process cuneiform in outline, moderately compressed transversely, the lateral margins evenly converging distad with the apex narrowly subtruncate, very shallowly (or more decidedly³⁵⁹) impressed mesad; interspace between the mesosternal lobes longitudinal, about 1.3 times as deep as broad, subrectangulate in outline, internal margin of lobes shallowly convex; metasternal lobes sub-attingent.

Metanotum and proximal abdominal tergites without traces of any supplementary lateral carinae, medio-dorsal carina of the abdomen as marked as in other members of the genus; ultimate abdominal tergite as in related species divided mesad and with the hircula developed as rather broad, low lobes, the distal margin of which is obliquely subtruncate, with the surface of the external fourth shallowly excavate dorsad; supra-anal plate scutellate in outline, its proximal breadth slightly greater than its median length (as 34 to 31), the lateral margins subarcuate to the well-rounded apex, but with a shallow marginal shoulder at distal third, surface of plate with a medio-longitudinal well-marked sulcus in proximal two-fifths, this sculpture flattened ventrad and with sub-vertical lateral borders, surface of median section of plate distad of sulcus moderately arcuate transversely, the lateral sections of the surface with relatively broad, transversely concave longitudinal impressions reaching distad to the shoulder of the lateral margins; cerci reaching distad as far as the apex of the supra-anal plate, simple, styliform, tapering, and acuminate with apex acute, subcompressed as seen from dorsum, in profile seen to be evenly but slightly decurving; subgenital plate relatively short but distinctly conical, as a whole culminating in the short but pronounced apical process, which, however, is hardly at all elevated above the subcingulate dorsal borders of the plate.

Cephalic and median femora markedly inflated, much as in the same sex of *K. usitatus* but the median ones are not quite as strongly bullate and more elongate proportionately. Caudal femora much as in *K. usitatus* and *cognatus* but genicular lobes more rectangulate and less rounded distad; caudal tibiae slightly more slender than in *usitatus*, armed on external margin with 10-11 spines, internal with 10.

Allotype.—♀; same data as type (Division of Entomology Museum, C.S.I.R.O., Canberra).

Differing from the preceding description of the male sex, and also of the females of the other species of the genus, in the following noteworthy respects.

Form proportionately more slender than in the females of the other species of the genus; surface not as smooth as in the male sex but with the usual metazonal cribrato-punctulations subobsolete.

Head with its general proportions much as in the male, the dorsal narrowing of the whole head appreciably less marked than in the female sex of the other

³⁵⁹ The strength of this indentation of the apical margin varies individually. It is quite weak in the type specimen.

species of the genus, occipital profile much as in the female of *usitatus*; fastigium with its general pattern as seen from the dorsum essentially as in the male and hence different from that of the female sex of the other species of the genus, length of fastigium cephalad of eyes equal to live-twelfths of the greatest fastigial breadth (as 15 to 36), the outline of the fastigium as seen from the dorsum being somewhat more obtuse than a right angle and with its apex broadly rounded, impression of fastigial disk very similar to but broader than in the male sex and not extending caudad over the interocular area, which in breadth is equal to three-fourths of the greatest breadth of the fastigium (as 27 to 36); fastigio-facial angle as seen in profile sharper than in the female sex of any of the other species of the genus, being subrectangulate, with the immediate apex very narrowly rounded, the line of the fastigium but little declivent and showing the shallow excavation of the fastigial disk; facial profile with slope much as in *K. cognatus* but not as convex and much straighter dorsad where it passes into the fastigio-facial angle; frontal costa but moderately broad, narrower than in the female sex of congeneric species, subdeplanate, its lateral margins subparallel from the interantennal area ventrad, dorsad from that point regularly converging to the quite narrow fastigial junction, lateral borders rounded in section but hardly carinate, sulcation very shallowly impressed about and ventrad of the median ocellus, surface of costa except for lateral margins irregularly impresso-punctate; lateral facial carinae more strongly marked than in the same sex of the other congeneric species, most elevated opposite the ventral portion of the eyes; eyes slightly larger and more evident than in the female sex of the other species of *Kosciuscola*, as seen in profile very much as in the male sex, but with greatest breadth equal to seven-tenths of their greatest depth (as 35 to 51). Antennae about 1.6 times as long as the pronotal disk.

Pronotum, as in the male, more slender than that of any of the females of the other species of the genus, although in its dorsal aspect it shows greater resemblance to that of the female of *K. cognatus* than to any other, however, being more longitudinal and subcompressed, yet not as constricted mesad nor as sellate, the dorsal line also being straight, greatest breadth of pronotum across lateral lobes caudad being nearly equal to 1.2 times the median length of the disk (as 36 to 31), while the least breadth of the disk, which is at the cephalic margin, is two-thirds that at the caudal margin (as 22 to 33); cephalic margin of disk subtruncate, caudal margin of same very similar to that of the female of *K. cognatus* but with the median section more deeply and angularly emarginate, median carina well marked and narrow as in the male, intersected by both the first and the principal transverse sulcus; lateral shoulders of disk as marked as in the female sex of *cognatus*, throughout evenly diverging caudad, transverse sulci shallowly impressed, the principal one slightly caudad of the caudal third of the disk, surface of discal metazona weakly and areally obscurely and cribrosely subpunctulate; lateral lobes of pronotum as described for the male sex.

Tegmina reaching to middle of second abdominal tergite, other features as described for male sex.

Prosternal process shorter and broader than in male but similarly cuneiform in outline and also compressed transversely more strongly, apex with median emargination more evident than in male and giving this area a sub-bimammilloid appearance; interspace between the mesosternal lobes moderately transverse, equal in breadth to five-eighths that of one of the lobes; metasternal lobes separated by an interspace equal to the breadth between the external borders of the foveae.

Abdominal, and metanotal, carinae and sculpture as in the male, the former, however, moderately evident to the ultimate tergite; supra-anal plate roughly trigonal in outline, in general proportions and sculpture as in the female sex of *K. cognatus*; cerci simple, styliform, tapering, falling somewhat short of the apex of the supra-anal plate, infra-cercal plate subequalling the supra-anal plate in length; dorsal ovipositor valves much like those of *cognatus*, as seen from dorsum more slender than in *tristis* and more robust than in *usitatus*, in profile as in *cognatus*, ventral valves much as in *cognatus* as seen in both ventral and lateral aspects, lateral plates as in the same species; subgenital plate with its marginal infra-cercal emarginations much as in *cognatus*, median production (intervalvar) trigonal with a spiculiform apex.

Cephalic and median limbs in proportionate length and robustness as in the female sex of *cognatus*. Caudal femora moderately slender, in general form and proportions much as those of the female of *cognatus*, with the apices of genicular lobes, as in the male sex, sharper and subrectangulate; caudal tibiae with 11 external and 10-12 internal spines.

MEASUREMENTS (mm)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Greatest Caudal Breadth Across Lateral Lobes of Pronotum	Length of Tegmen	Length of Caudal Femur	Greatest Depth of Caudal Femur
♂, Bull's Head, A.C.T., <i>paratype</i> ³⁶⁰	18.0	6.7	3.4	3.7	3.4 ³⁶¹	12.3	3.1
♂, Bull's Head, A.C.T., <i>paratype</i>	18.7	7.2	3.7	4.1	3.4	11.8	3.0
♂, Mt. Gingera, A.C.T., <i>paratype</i>	18.1	6.3	3.7	4.1	2.84	12.3	3.0
♂, Mt. Tidbinbilla, 5124 ft, A.C.T., <i>paratype</i>	19.1	6.3	3.7	4.1	3.6	12.1	3.3
♂, Mt. Tidbinbilla (NE. slopes), A.C.T., <i>paratype</i>	21.6	— ³⁶²	3.9	4.4	4.4	13.2	3.3
♂, Lee's Spring, A.C.T., <i>paratype</i>	19.5	6.7	3.4	3.9	3.1	11.8	2.84
♂, Lee's Spring, A.C.T., <i>type</i>	20.8	6.6	3.6	3.6	3.0	11.8	3.0
♂, Lee's Spring, A.C.T., <i>paratype</i>	22.9	6.7	3.9	4.2	3.4	12.6	3.4

MEASUREMENTS (mm) (*Continued*)

Specimen	Length of Body	Length of Antenna	Length of Pronotum	Greatest Caudal Breadth Across Lateral Lobes of Pronotum	Length of Tegmen	Length of Caudal Femur	Greatest Depth of Caudal Femur
♂, Mt. Coree, N.S.W., <i>paratype</i>	21.1	7.1	3.9	4.1	4.1	13.4	3.4
♂, 3 miles NE. of Hotel Kos- ciusko, N.S.W.	18.2	6.4	3.4	3.6	3.4	11.3	3.1
♂, 3 miles SW. of Mt. Hotham, Vic.	16.4	7.1	3.6	3.6	3.1	10.8	2.84
♂, 6 miles SW. of Mt. Hotham, Vic. ³⁶⁰	18.0	5.5	3.7	4.0	1.58	11.8	2.84
♂, 10 miles S. of Harrietville, Vic. ³⁶⁰	17.8	5.8	3.6	4.4	2.21	12.0	2.84
♂, Mt. Buffalo, Vic. ³⁶⁰	17.6	5.3	3.6	3.9	2.52	11.8	2.84
♀, Bull's Head, A.C.T., <i>paratype</i>	26.3	— ³⁶²	5.0	6.0	4.4	15.4	3.9
♀, Bull's Head, A.C.T., <i>paratype</i>	31.2	7.2	4.8	6.1	5.0	18.9	3.9
♀, Mt. Gingera, A.C.T., <i>paratype</i>	24.3	6.6	4.8	5.5	3.7	15.3	3.4
♀, Mt. Tidbinbilla (NE. slopes), A.C.T., <i>paratype</i>	32.0	6.9	5.5	6.4	3.6	16.8	3.9
♀, Lee's Spring, A.C.T., <i>paratype</i>	27.6	7.1	4.4	5.2	4.1	14.6	3.6
♀, Lee's Spring, A.C.T., <i>allotype</i>	28.7	7.5	4.7	5.6	4.7	15.7	3.9
♀, Lee's Spring, A.C.T., <i>paratype</i>	33.1	7.4	5.0	5.8	4.4	16.5	3.7
♀, Peter's Camp, A.C.T., <i>paratype</i>	31.4	7.9	5.5	6.7	5.0	16.5	3.9
♀, Mt. Coree, N.S.W., <i>paratype</i>	28.1	7.1	5.0	6.0	3.9	15.9	3.9
♀, Mt. Coree, N.S.W., <i>paratype</i>	34.2	8.3	5.2	6.4	4.7	17.0	4.2
♀, 3 miles NE. of Hotel Kosciusko, N.S.W.	24.3	6.3	4.4	5.5	4.2	14.5	3.4
♀, 6 miles SW. of Mt. Hotham, Vic.	23.2	6.6	3.9	5.2	3.9	13.2	3.1
♀, Mt. Feathertop, Vic.	25.4	7.1	4.1	5.2	4.2	14.3	3.0
♀, Mt. Buffalo, Vic.	24.4	— ³⁶²	4.7	5.5	3.9	15.3	3.7

The above figures of extremes of the size range at individual localities demonstrate that there is a considerable degree of individual size variation in

³⁶⁰ This specimen is one of those presumably parasitized, which are discussed here under "Remarks".

³⁶¹ Right tegmen only—left one but 1.10 mm long.

³⁶² Too tightly curled to measure.

this form as in other species of the genus, and further that the maximum-sized individuals in both sexes are from the more northern portion of the species's range. The relatively small size of those from the Kosciusko Massif and from localities in the Victorian highlands may indicate the influence of more severe alpine conditions. However, most of the males from Victorian localities are abnormal in respect to the development of their external genitalia, which I regard as a concomitant of parasitism in earlier instars, and which is discussed beyond under "Remarks". If parasitism is the proper explanation of these conditions it is quite understandable that it could be, at least, one of the causes of the generally smaller size of these male specimens. However, the Victorian individuals, regardless of any influence of these unusual conditions in the males, average smaller in both sexes, as the above measurements of body length, pronotum, tegmen, and of the caudal femur demonstrate.

Coloration.—This species is the only one of the genus which, on the basis of the considerable representation before me, shows no indication of a green phase. The base tone of all the individuals of both sexes covers a range of umber and bister shades with the chief elements of a darker fuscous overlaid pattern consisting of pronotal post-ocular pleural and abdominal lateral bars, reaching virtually to the apex of the abdomen, strongly bicoloured tegmina, a pale oblique bar on the pleura, and infusate distal extremities to the caudal femora. The base tone ranges from as pale as russet, to as dark as prout's brown or bister, while the overlaid pattern is fuscous to fuscous-black. The head has the face and mouth-parts citrine-drab to olive-brown, distinctly punctate with fuscous in those with a paler ground tone, genae of the same tones but without the fuscous punctations, post-ocularly there may or may not be intimations of post-ocular bars on the head; eyes pale olive to bister; antennae of the general colour proximad, becoming infusate distad. Pronotum with the lateral carinae of the disk sometimes obscurely pencilled with tawny-olive to snuff brown, the usually marked and broad post-ocular dark bar dorsad on the lateral lobes with several greyish blotches at their ventral border in a median position on the lobes. Tegmina with the discoidal area solidly fuscous to blackish fuscous, anal area sharply and solidly contrasted cream colour to naples yellow, this also colouring the tegminal anal vein and being the tone of the oblique pale bar on the pleura. The abdomen generally shows a definite demarcation between the general tone of its dorsal surface and the dark lateral bars, but this may be lacking and the dorsum hardly, if at all, paler than the dark lateral bars. This latter condition, however, is noticed only in the male sex. Cephalic and median limbs of the general tone. Caudal femora with external pagina ranging from light brownish olive (this more frequent in males) to as dark as bister, the dorsal surfaces ranging from the same paler tone or clay colour to Saccardo's umber, these areas in those individuals having the same or paler tones usually transversely barred with two blotches of umber to fuscous, which are usually much less evident in males than in females, often merely shadow blotches, and generally carried over on to the dorsal section of the otherwise pale internal face, ventral sulcus carmine with its external bordering carina lined with mustard yellow to naples yellow,

ventro-external face lined with carmine to garnet brown, the ventral carina of the external face weakly pencilled with naples yellow, entire genicular extremity of the femora fuscous to blackish with the margin of the lobes distad finely lined with greyish; caudal tibiae rather deep glaucous blue, darkening distad to dusky dull bluish green (of Ridgway), pale post-genicularly with the internal face of the genicular extremity blackish, spines very pale glaucous-blue proximad with fuscous tips; caudal tarsi coloured as the tibiae distad.

Certain areal tendencies in the general tone of the coloration are noticed in the series of somewhat over 100 specimens of the species before me. The generally darkest specimens are from the Mt. Tidbinbilla area of the Australian Capital Territory, although these are equalled by some, chiefly males, of the Lee's Spring series. However, this latter considerable representation of over 50 adults shows the full colour range seen in the species, this particularly evident in the female sex. The Kosciusko Massif material is duller in contrast, except for the bicoloured tegmina, than the Australian Capital Territory representation, which is also true of the few adults from the Victorian mountains. Immature individuals are all more largely wood brown, and generally paler than adults. The bicoloured tegmina are conspicuous in all adults regardless of the depth of other general tones.

Structural variation.—The Lee's Spring and Mt. Corree individuals of both sexes show appreciable variation in the relative proportions (i.e. length and breadth) of the tegmina, and in consequence in the general shape of their outline. Also males with otherwise normally developed external genitalia show appreciable variation in the exact outline and relative median length and proximal breadth of the supra-anal plate. There is also some little variation in the proportionate length of the male cerci.

Remarks.—As has been noted for *K. cognatus* and *usitatus*, under this heading, certain male individuals are definitely aberrant in the development of their external genitalia. These are one of the three males from Bull's Head, A.C.T., the single male from 6 miles SW. of Mt. Hotham, Vic., the male from 10 miles S. of Harrietteville, Vic., and the sole male from Mt. Buffalo, Vic. None of the considerable series of males from Lee's Spring (the type locality) shows any similar aberrational tendencies. Thus most of these imperfectly developed males are from Victorian localities, which is not the case with the other species of the genus showing similar departures from the norm of the species. In these individuals the supra-anal plate is generalized in its shape and surface sculpture, the distal portion of the subgenital plate also is much simpler and the whole apex of the abdomen less recurved than in a normal male, while the furcula are absent or at least obsolete. In all the Victorian aberrational males the tegmina are greatly reduced in size (see preceding table of measurements), while in that from Bull's Head with aberrant external genitalia the right tegmen is of normal development (3.4 mm long), and its mate on the left is but 1.10 mm long, thus showing definite abnormality in the individual in this respect. Of the five adult males of *cuneatus* from Victorian localities now before me four show departures from the norm of the species. As with the similar cases of aberrantly

developed males in other species of the genus I am convinced that the cause of this imperfect development has been parasitism in earlier instars. I do not regard them as intersexes, their usual depauperation in tegminal size alone demonstrating, in my opinion, the operation of some overall inhibiting factor, such as parasitism. While some details, such as the fastigial proportions, in these specimens approach what we find in a normal female, I feel that this is merely an expression of the greater emphasis often seen in immature individuals of features which in the imago are female characteristics, in these cases retained through extraneous influences which have inhibited the development of structural patterns found in normal adult males. To prove this condition to be intersexuality requires the confirming evidence of internal heterosexuality, which, of course, cannot be secured from dry material.

Paratypes.—The following specimens have been designated as paratypes: Bull's Head, A.C.T., 4325 \pm 25 ft, 5 ♂, 5 ♀;³⁶³ Mt. Gingera, A.C.T., 6092 ft, 1 ♂, 2 ♀; near Mt. Ginini, A.C.T., 1 ♀; 1 mile NE. of Mt. Tidbinbilla, A.C.T., c. 4400 ft, 1 ♀; Mt. Tidbinbilla (near summit), 1 ♂, 1 ♀; Mt. Tidbinbilla, A.C.T., 5124 ft, 1 ♂; Mt. Tidbinbilla (NE. slope), A.C.T., c. 4300-4860 ft, 1 ♂, 1 ♀; Lee's Spring, A.C.T., 24 ♂, 26 ♀; near Lee's Spring, A.C.T., 3800 \pm 50 ft, 3 ♀; Peter's Camp, A.C.T., 3975 \pm 25 ft, 1 ♀; Mt. Coree, N.S.W., 6 ♂, 6 ♀.

Distribution.—Mountains of the Australian Capital Territory, the Kosciusko Massif of New South Wales, and higher areas of the Victorian Alps of north-eastern Victoria. It is apparently absent from the highest elevations of the Kosciusko Massif, but does occur there as high as 5360-5508 ft, and in the mountains of the Capital Territory up to 6091 ft (Mt. Gingera). There is no altitudinal information accompanying the available Victorian material, but at least some of it was taken at stations in excess of 5000 ft elevation. The lowest points from which we have definite altitude information for *cuneatus* are: near Lee's Spring, A.C.T., at approximately 3800 ft, and near Peter's Camp in the same area, similarly approximately 3975 ft. The dates represented by adult material are November 17 (near Hotel Kosciusko, N.S.W.), and January 30 to March 25 (by localities in Australian Capital Territory, New South Wales, and Victoria).

Specimens examined.—107; 49 ♂, 53 ♀, 5 juv. ♀.

Australian Capital Territory.—Bull's Head, 4325 \pm 25 ft;³⁶⁴ 18.ii.1914 (K. H. L. Key) 5 ♂ (*paratypes*), 5 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Near Mt. Ginini;³⁶⁵ 13.iii.1951 (L. J. Chinnick) 1 ♀ (*paratype*) (Division of Entomology

³⁶³ Full information as to dates and collectors will be found in the tabulation of "Specimens examined" at the end of the specific treatment.

³⁶⁴ "A trig. station in the western ranges of the A.C.T. right on the Territory boundary, and about 6 miles south of the point where the straight north-western boundary passes into the irregular western boundary running along the divide of the western range." (Information from Dr. Key, May 1949.)

³⁶⁵ "In the Brindabella Range (which forms the western boundary of the Australian Capital Territory), almost half-way from Mt. Franklin to Mt. Gingera, i.e. three miles air-line due S. of Mt. Franklin. The altitude of the summit is given as 5782 ft." (Information from Dr. Key, July 1955.)

Museum, C.S.I.R.O., Canberra). Mt. Gingera,³⁶⁶ 6091 ft; 8.iii.1944 (Key and Pryor) 1 ♂ (*paratype*) 1 ♀ (*paratype*) (Division of Entomology Museum, C.S.I.R.O., Canberra); 30.i.1952 (K. H. L. Key) 1 ♀ (*paratype*) (Academy of Natural Sciences of Philadelphia). 1 mile NE. of Mt. Tidbinbilla, c. 4100 ft; 25.iii.1951 (K. H. L. Key) 1 ♀ (*paratype*) (Division of Entomology Museum, C.S.I.R.O., Canberra). Mt. Tidbinbilla³⁶⁷ (near summit); 25.iii.1951 (K. H. L. Key) 2 ♂ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia); 5121 ft; 25.iii.1951 (K. H. L. Key) 1 ♂ (*paratype*) (Division of Entomology Museum, C.S.I.R.O., Canberra); NE. slopes, c. 4300-4860 ft; 25.iii.1951 (K. H. L. Key) 1 ♂ (*paratype*), 1 ♀ (*paratype*) (Division of Entomology Museum, C.S.I.R.O., Canberra). Lee's Spring; 3.iii.1938 (K. H. L. Key) 21 ♂ (*type* and *paratypes*) 26 ♀ (*allotype* and *paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia); 26.ii.1938 (T. G. Campbell) 1 ♂ (*paratype*), 1 ♀ (*paratype*) (Division of Entomology Museum, C.S.I.R.O., Canberra). Near Lee's Spring, 3800 ± 50 ft; 18.ii.1944 (Key and Prior) 3 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Near Peter's Camp,³⁶⁸ 3975 ± 100 ft; 18.ii.1944 (K. H. L. Key) 1 ♀ (*paratype*), 1 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra).

New South Wales.—Mt. Coree;³⁶⁹ 14.iii.1950 (K. H. L. Key) 6 ♂ (*paratypes*), 6 ♀ (*paratypes*) (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 3 miles NE. of Hotel Kosciusko [Kosciusko Massif], 4756 ft; 6.iii.1946 (K. H. L. Key) 1 ♂, 2 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). 4 miles SW. of Hotel Kosciusko [Kosciusko Massif], 5360-5508 ft; 6.iii.1946 (K. H. L. Key) 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). Mt. Kosciusko, near hotel; 17.xi.1938 1 ♂, 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra).

Victoria.—3 miles SW. of Mt. Hotham; 23.ii.1947 (Key, Carne, and Rothery) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). 6 miles SW. of Mt. Hotham; 23.ii.1947 (Key, Carne, and Rothery) 1 ♂, 1 ♀, 2 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia). Mt. Feathertop; 22.ii.1947 (Key and Carne) 1 ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra). 10 miles S. of Harrietville; 23.ii.1947 (Key, Carne, and Rothery) 1 ♂ (Division of Entomology Museum, C.S.I.R.O., Canberra). Mt. Buffalo; 21.ii.1947 (Key, Carne, and Rothery) 1 ♂, 1 ♀, 2 juv. ♀ (Division of Entomology Museum, C.S.I.R.O., Canberra, and Academy of Natural Sciences of Philadelphia).

³⁶⁶ "A peak on the western boundary about 1½ miles S. of the latitude of Mt. Kealmie Trig. Station," (Information from Dr. Key, May 1949.)

³⁶⁷ "Seven miles ENE. of Mt. Franklin. The highest point of the Tidbinbilla Range, flanking the Cotter Valley on the east. Altitude, 5121 ft." (Information from Dr. Key, March 1953.)

³⁶⁸ "Two miles SSW. of Mt. Coree. 3975 ft." (Information from Dr. Key, March 1953.)

³⁶⁹ "At NW. angle of boundary of A.C.T. Elevation of summit, 4657 ft." (Information from Dr. Key, Sept. 1950.)

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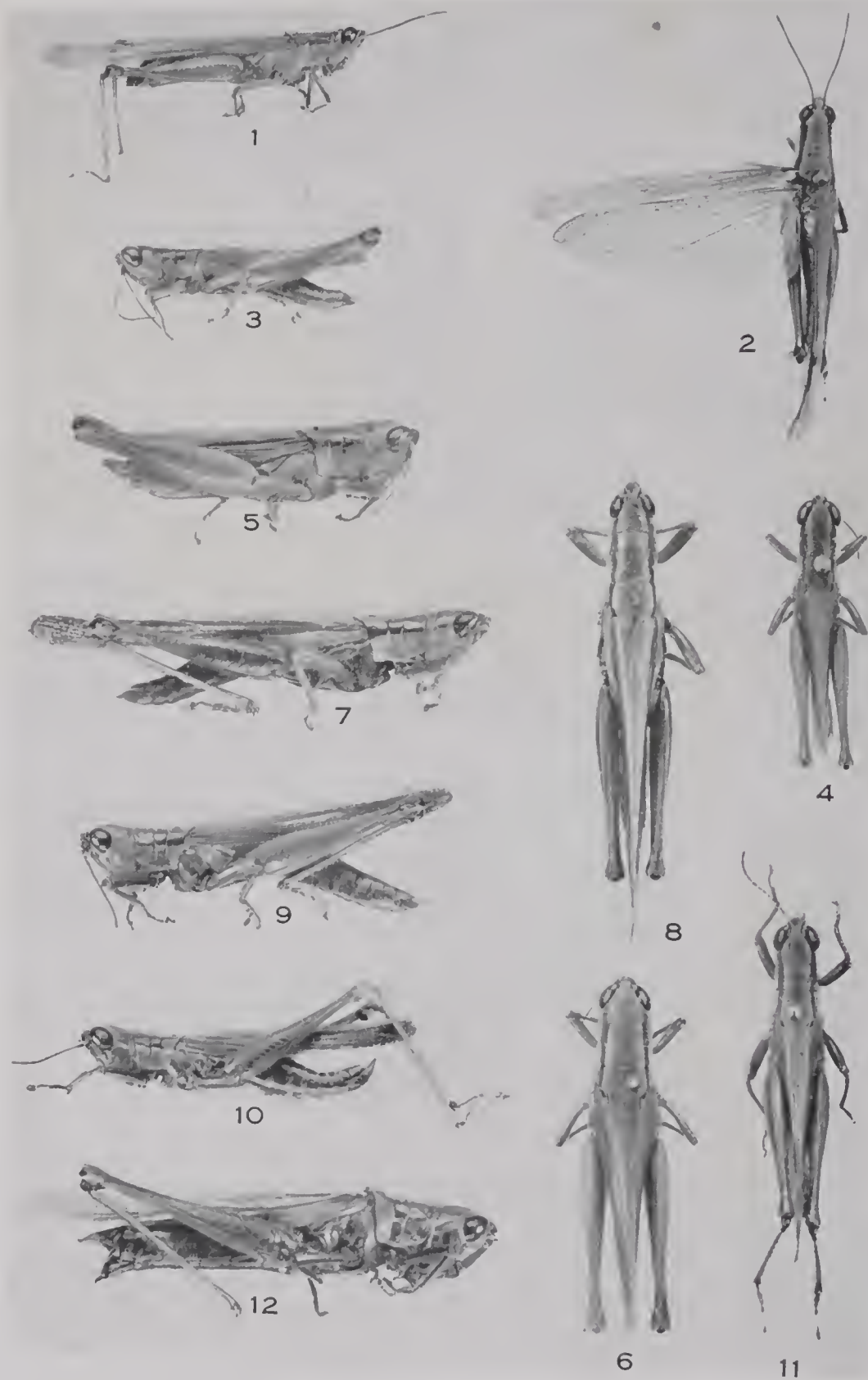


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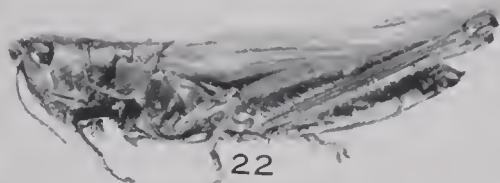
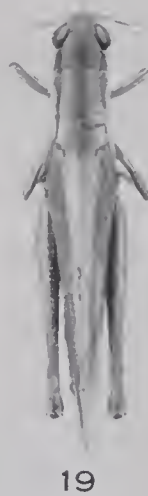
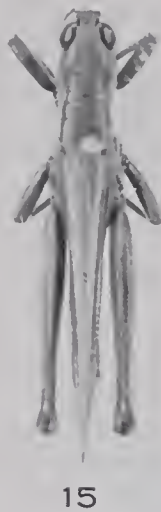
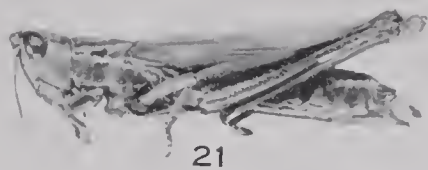
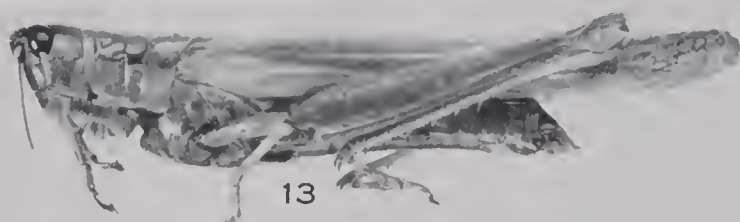


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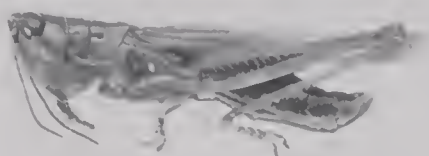
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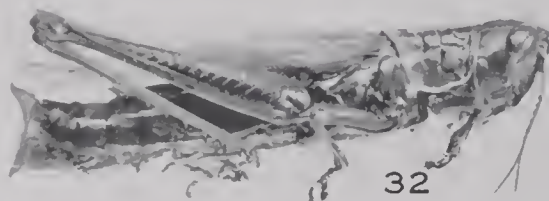
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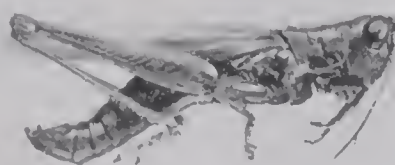
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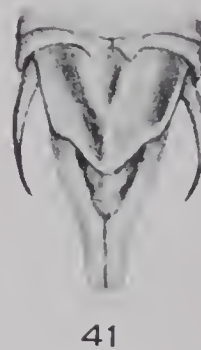
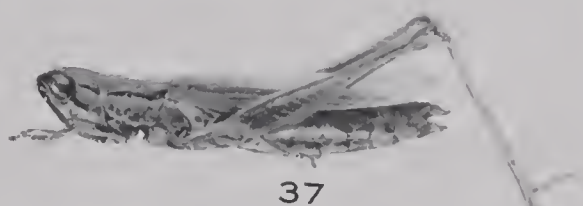
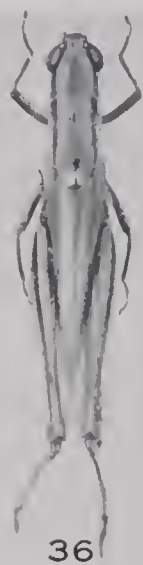
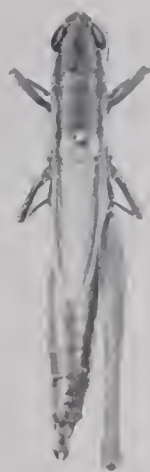


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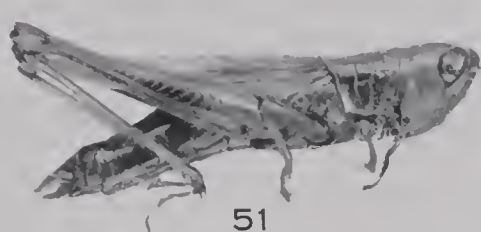


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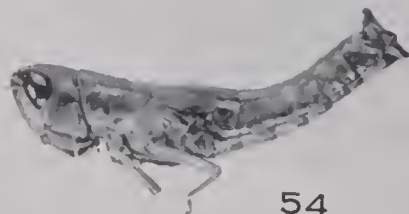
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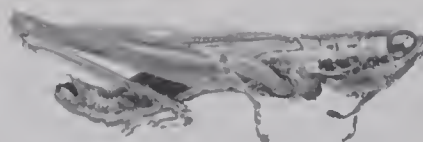
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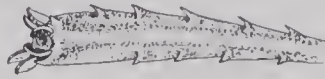
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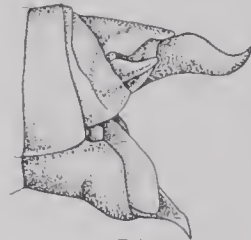
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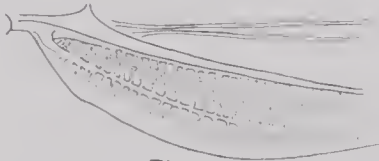
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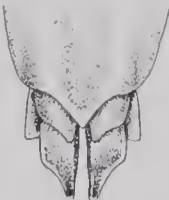
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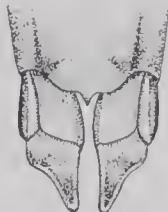
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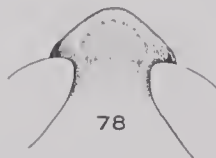
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- Fig. 81.—*Bermius brachycerus planicola* n. subsp. Male (type). Callubri Station, near Nyngan, N.S.W. Dorsal view of fastigium. (Greatly enlarged.)
- Fig. 82.—*Bermius brachycerus planicola* n. subsp. Male (type). Callubri Station, near Nyngan, N.S.W. Lateral view of fastigium. (Greatly enlarged.)
- Fig. 83.—*Bermius brachycerus planicola* n. subsp. Female (allotype). Callubri Station, near Nyngan, N.S.W. Dorsal view of fastigium. (Greatly enlarged.)
- Fig. 84.—*Bermius brachycerus planicola* n. subsp. Female (allotype). Callubri Station, near Nyngan, N.S.W. Lateral view of fastigium. (Greatly enlarged.)
- Fig. 85.—*Bermius brachycerus magistralis* n. subsp. Male (type). Cotter River, A.C.T. Dorsal view of fastigium. (Greatly enlarged.)
- Fig. 86.—*Bermius brachycerus magistralis* n. subsp. Male (type). Cotter River, A.C.T. Lateral view of fastigium. (Greatly enlarged.)
- Fig. 87.—*Bermius brachycerus magistralis* n. subsp. Female (allotype). Cotter River, A.C.T. Dorsal view of fastigium. (Greatly enlarged.)
- Fig. 88.—*Bermius brachycerus magistralis* n. subsp. Female (allotype). Cotter River, A.C.T. Lateral view of fastigium. (Greatly enlarged.)
- Fig. 89.—*Bermius buntamurra* n. sp. Male (type). Ticklelara Head Station, Queensland. Dorsal view of fastigium. (Greatly enlarged.)
- Fig. 90.—*Bermius buntamurra* n. sp. Male (type). Ticklelara Head Station, Queensland. Lateral view of fastigium. (Greatly enlarged.)
- Fig. 91.—*Bermius buntamurra* n. sp. Female (allotype). Ticklelara Head Station, Queensland. Dorsal view of fastigium. (Greatly enlarged.)
- Fig. 92.—*Bermius buntamurra* n. sp. Female (allotype). Ticklelara Head Station, Queensland. Lateral view of fastigium. (Greatly enlarged.)
- Fig. 93.—*Bermius buntamurra* n. sp. Male (type). Ticklelara Head Station, Queensland. Lateral view of apex of abdomen. (Greatly enlarged.)
- Fig. 94.—*Bermius buntamurra* n. sp. Male (type). Ticklelara Head Station, Queensland. Dorsal view of apex of abdomen. (Greatly enlarged.)
- Fig. 95.—*Bermius buntamurra* n. sp. Female (allotype). Ticklelara Head Station, Queensland. Ventral view of apex of abdomen. (Greatly enlarged.)
- Fig. 96.—*Tolgadia cairnsensis* (Sjöstedt). Male (allotype). Cairns, Queensland. Cephalic view of face. (Enlarged.)
- Fig. 97.—*Tolgadia cairnsensis* (Sjöstedt). Male (allotype). Cairns, Queensland. Dorsal view of fastigium. (Greatly enlarged.)
- Fig. 98.—*Tolgadia cairnsensis* (Sjöstedt). Male (allotype). Cairns, Queensland. Lateral view of fastigium. (Greatly enlarged.)
- Fig. 99.—*Tolgadia cairnsensis* (Sjöstedt). Male (allotype). Cairns, Queensland. Lateral view of apex of abdomen. (Greatly enlarged.)
- Fig. 100.—*Tolgadia cairnsensis* (Sjöstedt). Male (allotype). Cairns, Queensland. Dorsal view of apex of abdomen. (Greatly enlarged.)

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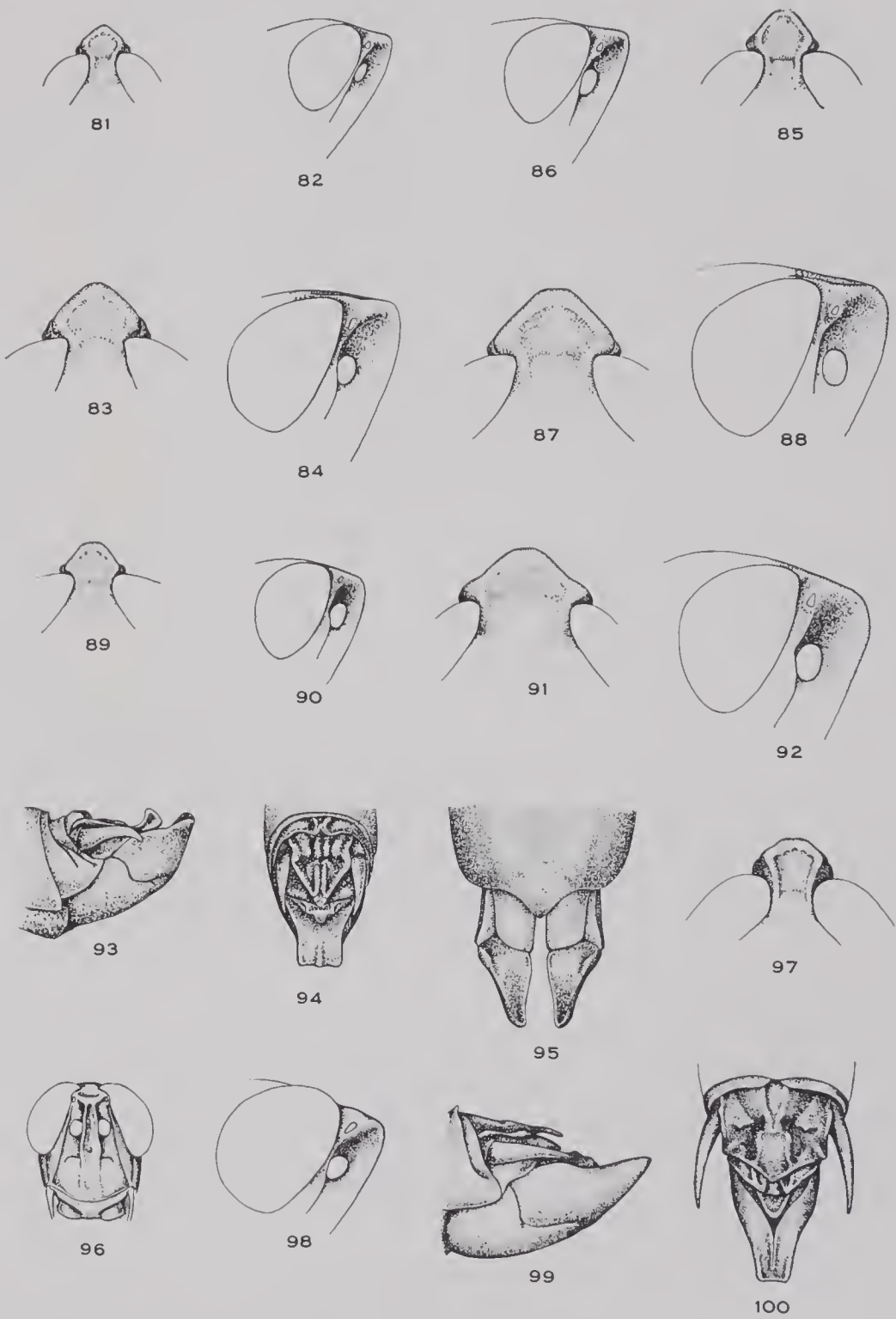


PLATE 10

- Fig. 119.—*Tolgadia tortilis* n.sp. Female (allotype). Cairns, Queensland. Dorsal view of fastigium. (Greatly enlarged.)
- Fig. 120.—*Tolgadia tortilis* n.sp. Female (allotype). Cairns, Queensland. Lateral view of fastigium. (Greatly enlarged.)
- Fig. 121.—*Tolgadia tortilis* n.sp. Female (allotype). Cairns, Queensland. Lateral view of apex of abdomen. (Greatly enlarged.)
- Fig. 122.—*Tolgadia tortilis* n.sp. Female (allotype). Cairns, Queensland. Dorsal view of apex of abdomen. (Greatly enlarged.)
- Fig. 123.—*Bermiodes nigro-bivittatus* L. Bolivar. Male. Banks Island, Torres Strait. Dorsal view of fastigium. (Greatly enlarged.)
- Fig. 124.—*Bermiodes nigro-bivittatus* L. Bolivar. Male. Banks Island, Torres Strait. Lateral view of pronotum. (Much enlarged.)
- Fig. 125.—*Bermiodes nigro-bivittatus* L. Bolivar. Male. Banks Island, Torres Strait. Lateral view of apex of abdomen. (Greatly enlarged.)
- Fig. 126.—*Bermiodes nigro-bivittatus* L. Bolivar. Male. Banks Island, Torres Strait. Dorsal view of apex of abdomen. (Greatly enlarged.)
- Fig. 127.—*Daperria accola* n.sp. Male (type). Sir Graham Moore Island, W.A. Dorsal view of fastigium. (Greatly enlarged.)
- Fig. 128.—*Daperria accola* n.sp. Male (type). Sir Graham Moore Island, W.A. Lateral view of pronotum. (Much enlarged.)
- Fig. 129.—*Daperria accola* n.sp. Male (type). Sir Graham Moore Island, W.A. Lateral view of apex of abdomen. (Greatly enlarged.)
- Fig. 130.—*Daperria accola* n.sp. Male (type). Sir Graham Moore Island, W.A. Dorsal view of apex of abdomen. (Greatly enlarged.)
- Fig. 131.—*Theomolpus badius* L. Bolivar. Female. Palm Island to Cooktown, Queensland. Dorsal view of fastigium. (Greatly enlarged.)
- Fig. 132.—*Theomolpus badius* L. Bolivar. Female. Palm Island to Cooktown, Queensland. Cephalic view of head. (Much enlarged.)
- Fig. 133.—*Theomolpus badius* L. Bolivar. Female. Palm Island to Cooktown, Queensland. Prosternal process. (Greatly enlarged.)

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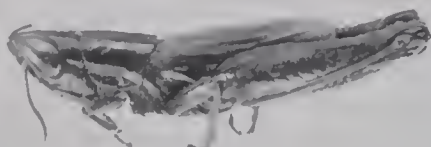
PLATE II

- Fig. 134.—*Laxabilla mirabilis* (Sjöstedt). Male. Tambourine Mountain, Queensland. Dorsal view. (x 3.)
- Fig. 135.—*Laxabilla mirabilis* (Sjöstedt). Male. Tambourine Mountain, Queensland. Lateral view. (x 3.)
- Fig. 136.—*Laxabilla mirabilis* (Sjöstedt). Female. Tambourine Mountain, Queensland. Dorsal view. (x 3.)
- Fig. 137.—*Laxabilla mirabilis* (Sjöstedt). Female. Tambourine Mountain, Queensland. Lateral view. (x 3.)
- Fig. 138.—*Laxabilla smaragdina smaragdina* Sjöstedt. Male. Mt. Coot-tha, Brisbane, Queensland. Dorsal view. (x 3.)
- Fig. 139.—*Laxabilla smaragdina smaragdina* Sjöstedt. Male. Mt. Coot-tha, Brisbane, Queensland. Lateral view. (x 3.)
- Fig. 140.—*Laxabilla smaragdina smaragdina* Sjöstedt. Female (type). Eidsvold, Queensland. Dorsal view. (x 3.)
- Fig. 141.—*Laxabilla smaragdina smaragdina* Sjöstedt. Female (type). Eidsvold, Queensland. Lateral view. (x 3.)
- Fig. 142.—*Laxabilla smaragdina acuta* n. subsp. Male (allotype). Eight miles N. of Gumin Gumin, Queensland. Dorsal view. (x 3.)
- Fig. 143.—*Laxabilla smaragdina acuta* n. subsp. Male (allotype). Eight miles N. of Gumin Gumin, Queensland. Lateral view. (x 3.)
- Fig. 144.—*Laxabilla smaragdina acuta* n. subsp. Female (type). Eight miles N. of Gumin Gumin, Queensland. Dorsal view. (x 3.)
- Fig. 145.—*Laxabilla smaragdina acuta* n. subsp. Female (type). Eight miles N. of Gumin Gumin, Queensland. Lateral view. (x 3.)

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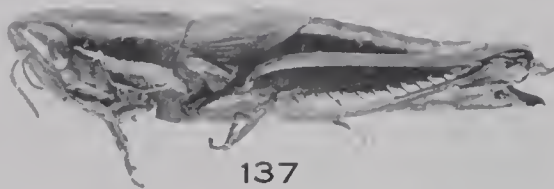
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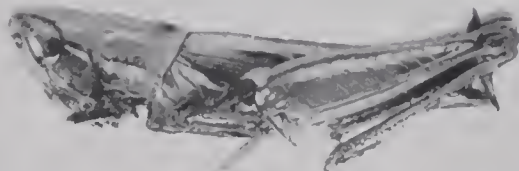
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- Fig. 146.—*Methiolopsis geniculata* (Stål). Male. Binna Burra, Queensland. Dorsal view. (x 3.)
- Fig. 147.—*Methiolopsis geniculata* (Stål). Male. Binna Burra, Queensland. Lateral view. (x 3.)
- Fig. 148.—*Methiolopsis geniculata* (Stål). Female. Mt. Coot-tha, Brisbane, Queensland. Dorsal view. (x 3.)
- Fig. 149.—*Methiolopsis geniculata* (Stål). Female. Mt. Coot-tha, Brisbane, Queensland. Lateral view. (x 3.)
- Fig. 150.—*Methiola picta picta* Sjöstedt. Male. Kuranda, Queensland. Dorsal view. (x 3.)
- Fig. 151.—*Methiola picta picta* Sjöstedt. Male. Kuranda, Queensland. Lateral view. (x 3.)
- Fig. 152.—*Methiola picta picta* Sjöstedt. Female. Kuranda, Queensland. Dorsal view. (x 3.)
- Fig. 153.—*Methiola picta picta* Sjöstedt. Female. Kuranda, Queensland. Lateral view. (x 3.)
- Fig. 154.—*Methiola picta gemmata* n. subsp. Male (allotype). Tully Falls, Queensland. Dorsal view. (x 3.)
- Fig. 155.—*Methiola picta gemmata* n. subsp. Male (allotype). Tully Falls, Queensland. Lateral view. (x 3.)

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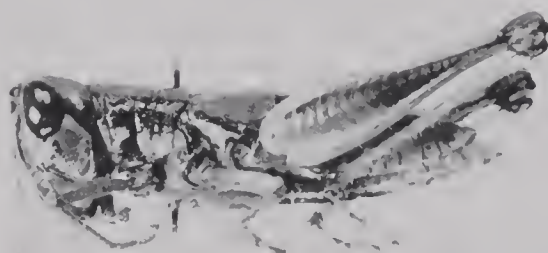
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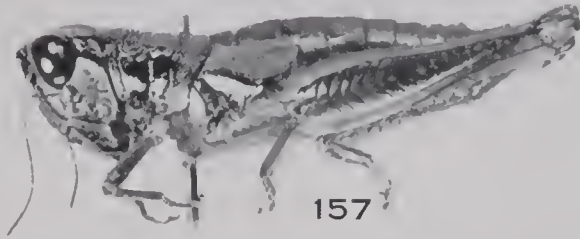


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- Fig. 156.—*Methiola picta gemmata* n. subsp. Female (type). Tully Falls, Queensland. Dorsal view. (x 3.)
- Fig. 157.—*Methiola picta gemmata* n. subsp. Female (type). Tully Falls, Queensland. Lateral view. (x 3.)
- Fig. 158.—*Praxibulus insolens* n. sp. Male (type). Snow Gum Arboretum, A.C.T. Dorsal view. (x 3.)
- Fig. 159.—*Praxibulus insolens* n. sp. Male (type). Snow Gum Arboretum, A.C.T. Lateral view. (x 3.)
- Fig. 160.—*Praxibulus insolens* n. sp. Female (allotype). Snow Gum Arboretum, A.C.T. Dorsal view. (x 3.)
- Fig. 161.—*Praxibulus insolens* n. sp. Female (allotype). Snow Gum Arboretum, A.C.T. Lateral view. (x 3.)
- Fig. 162.—*Praxibulus carnei* n. sp. Male (type). Mt. Buffalo, Vic. Dorsal view. (x 3.)

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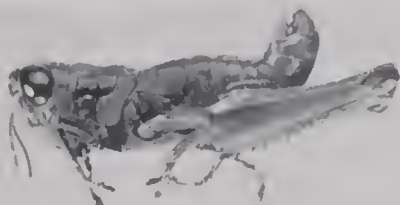


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- Fig. 163.—*Praxibulus carnei* n. sp. Male (type). Mt. Buffalo, Vic. Lateral view. (x 3.)
- Fig. 164.—*Praxibulus carnei* n. sp. Female (allotype). Mt. Buffalo, Vic. Dorsal view. (x 3.)
- Fig. 165.—*Praxibulus carnei* n. sp. Female (allotype). Mt. Buffalo, Vic. Lateral view. (x 3.)
- Fig. 166.—*Praxibulus nexilis* n. sp. Male (type). Eleven miles NW. of Kingston, N.S.W. Dorsal view. (x 3.)
- Fig. 167.—*Praxibulus nexilis* n. sp. Male (type). Eleven miles NW. of Kingston, N.S.W. Lateral view. (x 3.)
- Fig. 168.—*Praxibulus nexilis* n. sp. Female (allotype). Eleven miles NW. of Kingston, N.S.W. Dorsal view. (x 3.)
- Fig. 169.—*Praxibulus galeritus* n. sp. Male (type). Five miles E. of Kangaroo Valley, N.S.W. Dorsal view. (x 3.)

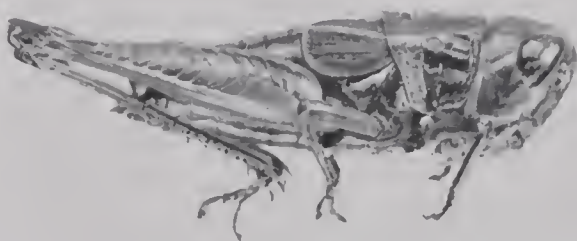
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- Fig. 170.—*Praxibulus nexilis* n.sp. Female (allotype). Eleven miles NW. of Kingston, N.S.W. Lateral view. (x 3.)
- Fig. 171.—*Praxibulus galeritus* n.sp. Male (type). Five miles E. of Kangaroo Valley, N.S.W. Lateral view. (x 3.)
- Fig. 172.—*Praxibulus galeritus* n.sp. Female (allotype). Five miles E. of Kangaroo Valley, N.S.W. Dorsal view. (x 3.)
- Fig. 173.—*Praxibulus galeritus* n.sp. Female (allotype). Five miles E. of Kangaroo Valley, N.S.W. Lateral view. (x 3.)
- Fig. 174.—*Praxibulus triangularis* n.sp. Male (type). One mile N. of Polblue, N.S.W. Dorsal view. (x 3.)
- Fig. 175.—*Praxibulus triangularis* n.sp. Male (type). One mile N. of Polblue, N.S.W. Lateral view. (x 3.)
- Fig. 176.—*Praxibulus triangularis* n.sp. Female (allotype). Three miles ESE. of Wharton's Mill, N.S.W. Lateral view. (x 3.)

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- Fig. 177.—*Praxibulus triangularis* n.sp. Female (allotype). Three miles ESE. of Wharton's Mill, N.S.W. Dorsal view. (x 3.)
- Fig. 178.—*Praxibulus duplex* n.sp. Male (type). One mile S. of Gormandale, Vic. Dorsal view. (x 3.)
- Fig. 179.—*Praxibulus duplex* n.sp. Male (type). One mile S. of Gormandale, Vic. Lateral view. (x 3.)
- Fig. 180.—*Praxibulus laminatus ulnaris* (Sjöstedt). Male. Two miles E. of Nowa Nowa, Vic. Dorsal view. (x 3.)
- Fig. 181.—*Praxibulus laminatus ulnaris* (Sjöstedt). Male. Two miles E. of Nowa Nowa, Vic. Lateral view. (x 3.)
- Fig. 182.—*Praxibulus laminatus ulnaris* (Sjöstedt). Female. Alexandria, Vic. Dorsal view. (x 3.)
- Fig. 183.—*Praxibulus laminatus ulnaris* (Sjöstedt). Female. Alexandria, Vic. Lateral view. (x 3.)

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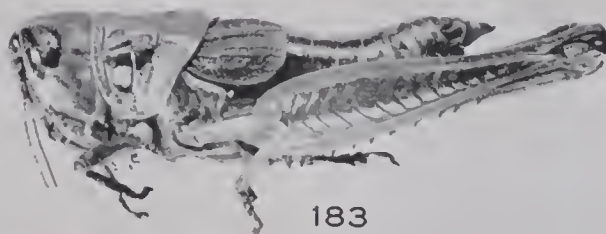
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- Fig. 184.—*Praxibulus laminatus laminatus* (Stål). Male. One mile W. of Mittagong, N.S.W. Dorsal view. (x 3.)
- Fig. 185.—*Praxibulus laminatus laminatus* (Stål). Male. One mile W. of Mittagong, N.S.W. Lateral view. (x 3.)
- Fig. 186.—*Praxibulus laminatus laminatus* (Stål). Female. One mile W. of Mittagong, N.S.W. Dorsal view. (x 3.)
- Fig. 187.—*Praxibulus laminatus laminatus* (Stål). Female. One mile W. of Mittagong, N.S.W. Lateral view. (x 3.)
- Fig. 188.—*Praxibulus laminatus actus* n. subsp. Male (type). Coolah to Cassilis, N.S.W. Dorsal view. (x 3.)
- Fig. 189.—*Praxibulus laminatus actus* n. subsp. Male (type). Coolah to Cassilis, N.S.W. Lateral view. (x 3.)
- Fig. 190.—*Praxibulus laminatus actus* n. subsp. Female (allotype). Coolah to Cassilis, N.S.W. Dorsal view. (x 3.)
- Fig. 191.—*Praxibulus laminatus actus* n. subsp. Female (allotype). Coolah to Cassilis, N.S.W. Lateral view. (x 3.)

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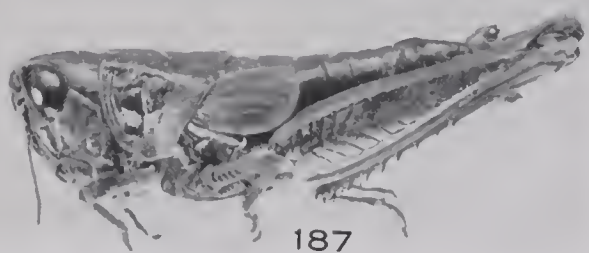


PLATE 18

- Fig. 192.—*Praxibulus exsculptus* n. sp. Male (type). Hunter Springs Station, N.S.W. Dorsal view. (x 3.)
- Fig. 193.—*Praxibulus exsculptus* n. sp. Male (type). Hunter Springs Station, N.S.W. Lateral view. (x 3.)
- Fig. 194.—*Praxibulus exsculptus* n. sp. Female (allotype). Hunter Springs Station, N.S.W. Dorsal view. (x 3.)
- Fig. 195.—*Praxibulus exsculptus* n. sp. Female (allotype). Hunter Springs Station, N.S.W. Lateral view. (x 3.)
- Fig. 196.—*Kosciuscola tristis tristis* Sjöstedt. Male. Mt. Kosciusko, N.S.W., 6850–7328 ft. Lateral view. (x 3.)
- Fig. 197.—*Kosciuscola tristis tristis* Sjöstedt. Female. Mt. Kosciusko, N.S.W. 7300 ft. Lateral view. (x 3.)

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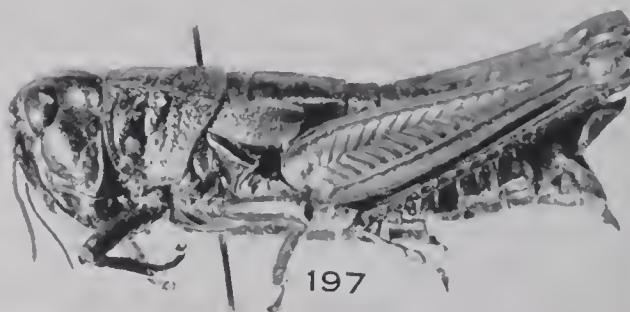
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- Fig. 198.—*Kosciuscola tristis tristis* Sjöstedt. Male. Mt. Kosciusko, N.S.W., 6850–7328 ft. Dorsal view. (x 3.)
- Fig. 199.—*Kosciuscola cognatus* n.sp. Male (type). Mt. Gingera, A.C.T., 5510–6092 ft. Lateral view. (x 3.)
- Fig. 200.—*Kosciuscola tristis restrictus* n.subsp. Male (type). Mt. Buffalo, Vic., c. 5600 ft. Dorsal view. (x 3.)
- Fig. 201.—*Kosciuscola tristis restrictus* n.subsp. Male (type). Mt. Buffalo, Vic., c. 5600 ft. Lateral view. (x 3.)
- Fig. 202.—*Kosciuscola tristis restrictus* n.subsp. Female (allotype). Mt. Buffalo, Vic., c. 5600 ft. Lateral view. (x 3.)
- Fig. 203.—*Kosciuscola cognatus* n.sp. Female (allotype). Mt. Gingera, A.C.T., 6097 ft. Lateral view. (x 3.)
- Fig. 204.—*Kosciuscola cognatus* n.sp. Male (type). Mt. Gingera, A.C.T., 5510–6092 ft. Dorsal view. (x 3.)
- Fig. 205.—*Kosciuscola cognatus* n.sp. Female (allotype). Mt. Gingera, A.C.T., 6097 ft. Dorsal view. (x 3.)

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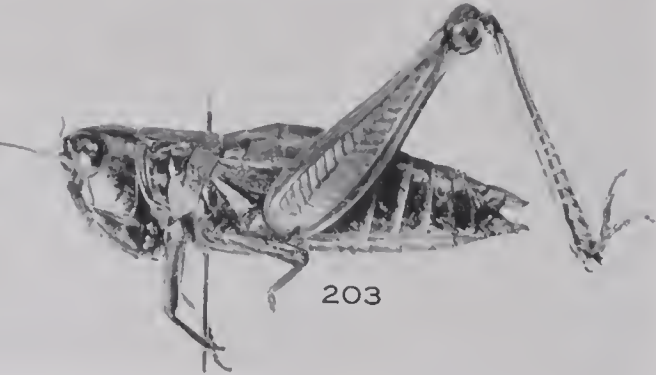
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- Fig. 206.—*Kosciuscola tristis tristis* Sjöstedt. Female. Mt. Kosciuszko, N.S.W., summit, 7300 ft. Dorsal view. (x 3.)
- Fig. 207.—*Kosciuscola tristis restrictus* n. subsp. Female (allotype). Mt. Buffalo, Vic., c. 5600 ft. Dorsal view. (x 3.)
- Fig. 208.—*Kosciuscola tasmanicus* n. sp. Male (type). Victoria Valley, Tasmania. Dorsal view. (x 3.)
- Fig. 209.—*Kosciuscola tasmanicus* n. sp. Male (type). Victoria Valley, Tasmania. Lateral view. (x 3.)
- Fig. 210.—*Kosciuscola tasmanicus* n. sp. Female (allotype). Victoria Valley, Tasmania. Dorsal view. (x 3.)
- Fig. 211.—*Kosciuscola tasmanicus* n. sp. Female (allotype). Victoria Valley, Tasmania. Lateral view. (x 3.)
- Fig. 212.—*Kosciuscola usitatus* n. sp. Male (type). Mt. Gingera, A.C.T., 6092 ft. Lateral view. (x 3.)
- Fig. 213.—*Kosciuscola cuuacatus* n. sp. Male (type). Lee's Spring, A.C.T. Lateral view. (x 3.)

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- Fig. 214.—*Kosciuscola usitatus* n. sp. Male (type). Mt. Gingera, A.C.T., 6092 ft. Dorsal view. (x 3.)
- Fig. 215.—*Kosciuscola cuneatus* n. sp. Male (type). Lee's Spring, A.C.T., Dorsal view. (x 3.)
- Fig. 216.—*Kosciuscola usitatus* n. sp. Female (allotype). Mt. Gingera, A.C.T., 6092 ft. Dorsal view. (x 3.)
- Fig. 217.—*Kosciuscola usitatus* n. sp. Female (allotype). Mt. Gingera, A.C.T., 6092 ft. Lateral view. (x 3.)
- Fig. 218.—*Kosciuscola cuneatus* n. sp. Female (allotype). Bull's Head, A.C.T., c. 4325 ft. Dorsal view. (x 3.)
- Fig. 219.—*Kosciuscola cuneatus* n. sp. Female (allotype). Bull's Head, A.C.T., c. 4325 ft. Lateral view. (x 3.)

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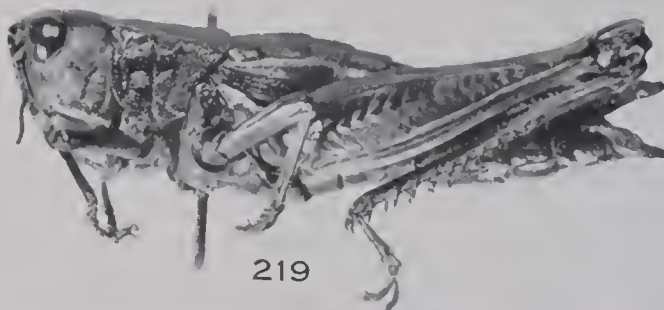
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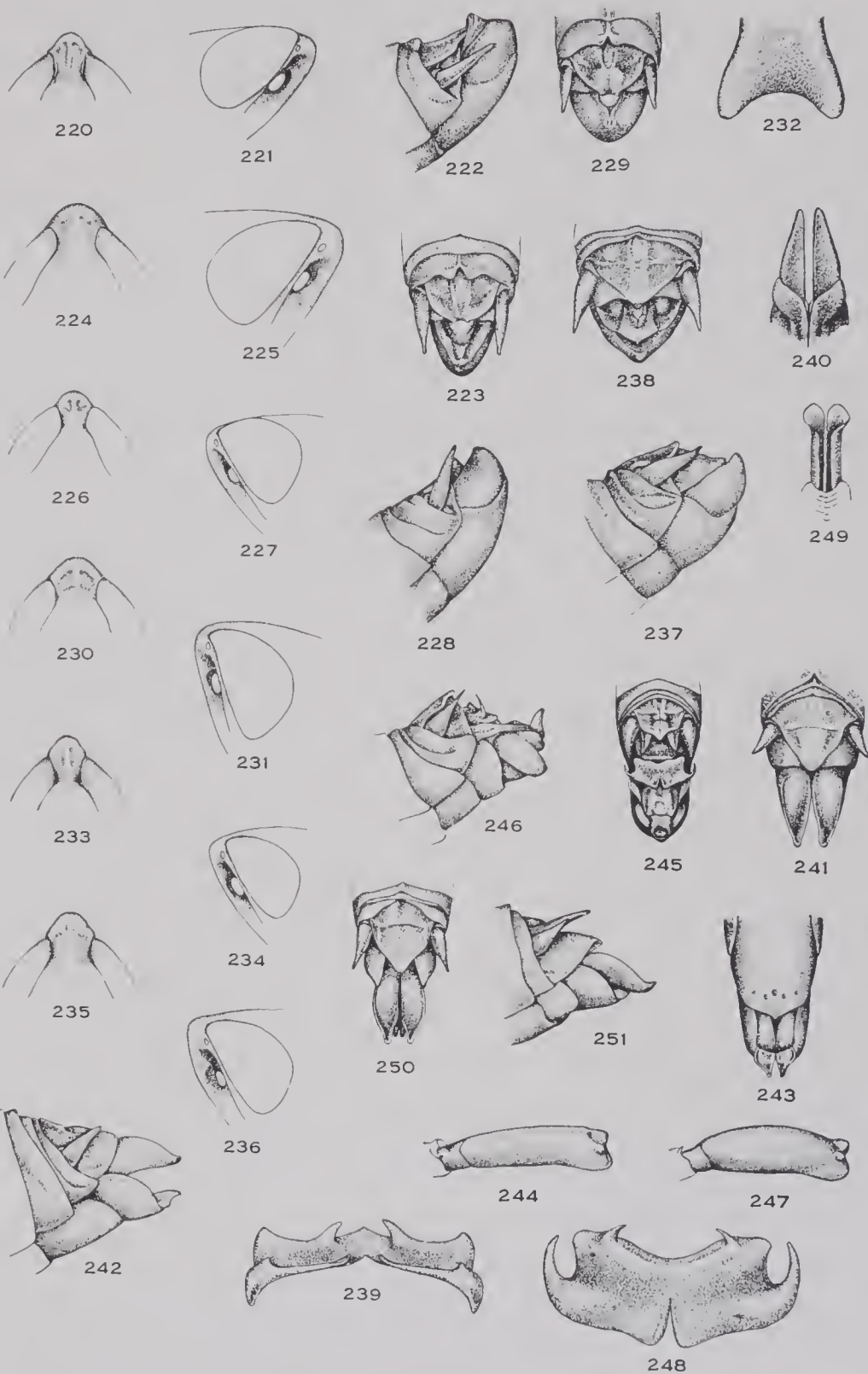
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- Fig. 220.—*Laxabilla mirabilis* (Sjöstedt). Male. Tambourine Mountain, Queensland. Dorsal view of lastigium.
- Fig. 221.—*Laxabilla mirabilis* (Sjöstedt). Male. Tambourine Mountain, Queensland. Lateral view of fastigium.
- Fig. 222.—*Laxabilla mirabilis* (Sjöstedt). Male. Tambourine Mountain, Queensland. Lateral view of apex of abdomen.
- Fig. 223.—*Laxabilla mirabilis* (Sjöstedt). Male. Tambourine Mountain, Queensland. Dorsal view of apex of abdomen.
- Fig. 224.—*Laxabilla mirabilis* (Sjöstedt). Female. Tambourine Mountain, Queensland. Dorsal view of lastigium.
- Fig. 225.—*Laxabilla mirabilis* (Sjöstedt). Female. Tambourine Mountain, Queensland. Lateral view of lastigium.
- Fig. 226.—*Laxabilla smaragdina smaragdina* Sjöstedt. Male. Mt. Coot-tha, Brisbane, Queensland. Dorsal view of lastigium.
- Fig. 227.—*Laxabilla smaragdina smaragdina* Sjöstedt. Male. Mt. Coot-tha, Brisbane, Queensland. Lateral view of fastigium.
- Fig. 228.—*Laxabilla smaragdina smaragdina* Sjöstedt. Male. Mt. Coot-tha, Brisbane, Queensland. Lateral view of apex of abdomen.
- Fig. 229.—*Laxabilla smaragdina smaragdina* Sjöstedt. Male. Mt. Coot-tha, Brisbane, Queensland. Dorsal view of apex of abdomen.
- Fig. 230.—*Laxabilla smaragdina smaragdina* Sjöstedt. Female (type). Eidsvold, Queensland. Dorsal view of fastigium.
- Fig. 231.—*Laxabilla smaragdina smaragdina* Sjöstedt. Female (type). Eidsvold, Queensland. Lateral view of lastigium.
- Fig. 232.—*Laxabilla smaragdina smaragdina* Sjöstedt. Female. Mt. Coot-tha, Brisbane, Queensland. Cephalic aspect of prosternal process.
- Fig. 233.—*Laxabilla smaragdina acuta* n. subsp. Male (allotype). Eight miles N. of Gumin Gumin, N.S.W. Dorsal view of fastigium.
- Fig. 234.—*Laxabilla smaragdina acuta* n. subsp. Male (allotype). Eight miles N. of Gumin Gumin, N.S.W. Lateral view of lastigium.
- Fig. 235.—*Laxabilla smaragdina acuta* n. subsp. Female (type). Eight miles N. of Gumin Gumin, N.S.W. Dorsal view of lastigium.
- Fig. 236.—*Laxabilla smaragdina acuta* n. subsp. Female (type). Eight miles N. of Gumin Gumin, N.S.W. Lateral view of lastigium.
- Fig. 237.—*Methiolopsis geniculata* (Stål). Male. Binna Burra, Queensland. Lateral view of apex of abdomen.
- Fig. 238.—*Methiolopsis geniculata* (Stål). Male. Binna Burra, Queensland. Dorsal view of apex of abdomen.
- Fig. 239.—*Methiolopsis geniculata* (Stål). Male. Mt. Coot-tha, Brisbane, Queensland. Epiphallus as seen from dorsum.
- Fig. 240.—*Methiolopsis geniculata* (Stål). Male. Mt. Coot-tha, Brisbane, Queensland. Aedeagus as seen in caudal aspect.
- Fig. 241.—*Methiolopsis geniculata* (Stål). Female. Mt. Coot-tha, Brisbane, Queensland. Dorsal view of apex of abdomen.
- Fig. 242.—*Methiolopsis geniculata* (Stål). Female. Mt. Coot-tha, Brisbane, Queensland. Lateral view of apex of abdomen.
- Fig. 243.—*Methiolopsis geniculata* (Stål). Female. Mt. Coot-tha, Brisbane, Queensland. Ventral view of apex of abdomen.
- Fig. 244.—*Methiolopsis geniculata* (Stål). Male. Binna Burra, Queensland. Median femur.
- Fig. 245.—*Methiola picta picta* Sjöstedt. Male. Kuranda, Queensland. Dorsal view of apex of abdomen, with internal parts extended.
- Fig. 246.—*Methiola picta picta* Sjöstedt. Male. Kuranda, Queensland. Lateral view of apex of abdomen, with internal parts extended.
- Fig. 247.—*Methiola picta picta* Sjöstedt. Male. Kuranda, Queensland. Median femur.
- Fig. 248.—*Methiola picta picta* Sjöstedt. Male. Kuranda, Queensland. Epiphallus as seen from dorsum.
- Fig. 249.—*Methiola picta picta* Sjöstedt. Male. Kuranda, Queensland. Aedeagus as seen in caudal aspect.
- Fig. 250.—*Methiola picta picta* Sjöstedt. Female. Kuranda, Queensland. Dorsal view of apex of abdomen.
- Fig. 251.—*Methiola picta picta* Sjöstedt. Female. Kuranda, Queensland. Lateral view of apex of abdomen.

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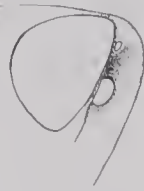


- Fig. 252.—*Methuola picta picta* Sjöstedt. Female. Kuranda, Queensland. Legmen.
- Fig. 253.—*Methuola picta gemmata* n. subsp. Male (allotype). Tully Falls, Queensland. Legmen.
- Fig. 254.—*Methuola picta gemmata* n. subsp. Male (allotype). Tully Falls, Queensland. Median femur.
- Fig. 255.—*Praxibulus insolens* n. sp. Male (type). Snow Gum Arboretum, A.C.T. Dorsal view of fastigium.
- Fig. 256.—*Praxibulus insolens* n. sp. Male (type). Snow Gum Arboretum, A.C.T. Lateral view of fastigium.
- Fig. 257.—*Praxibulus insolens* n. sp. Male (type). Snow Gum Arboretum, A.C.T. Dorsal view of apex of abdomen.
- Fig. 258.—*Praxibulus insolens* n. sp. Male (type). Snow Gum Arboretum, A.C.T. Lateral view of apex of abdomen.
- Fig. 259.—*Praxibulus insolens* n. sp. Female (allotype). Snow Gum Arboretum, A.C.T. Dorsal view of fastigium.
- Fig. 260.—*Praxibulus insolens* n. sp. Female (allotype). Snow Gum Arboretum, A.C.T. Lateral view of fastigium.
- Fig. 261.—*Praxibulus insolens* n. sp. Female (allotype). Snow Gum Arboretum, A.C.T. Ventral view of apex of abdomen.
- Fig. 262.—*Praxibulus carnei* n. sp. Male (type). Mt. Buffalo, Vic. Dorsal view of fastigium.
- Fig. 263.—*Praxibulus carnei* n. sp. Male (type). Mt. Buffalo, Vic. Lateral view of fastigium.
- Fig. 264.—*Praxibulus carnei* n. sp. Male (type). Mt. Buffalo, Vic. Dorsal view of apex of abdomen.
- Fig. 265.—*Praxibulus carnei* n. sp. Male (type). Mt. Buffalo, Vic. Lateral view of apex of abdomen.
- Fig. 266.—*Praxibulus nexilis* n. sp. Male (type). Eleven miles NW. of Kingston, N.S.W. Dorsal view of fastigium.
- Fig. 267.—*Praxibulus nexilis* n. sp. Male (type). Eleven miles NW. of Kingston, N.S.W. Lateral view of fastigium.
- Fig. 268.—*Praxibulus nexilis* n. sp. Male (type). Eleven miles NW. of Kingston, N.S.W. Dorsal view of apex of abdomen.
- Fig. 269.—*Praxibulus nexilis* n. sp. Male (type). Eleven miles NW. of Kingston, N.S.W. Lateral view of apex of abdomen.
- Fig. 270.—*Praxibulus nexilis* n. sp. Male (type). Eleven miles NW. of Kingston, N.S.W. Proximal crest of supra-anal plate as seen in cephalic aspect.
- Fig. 271.—*Praxibulus carnei* n. sp. Female (allotype). Mt. Buffalo, Vic. Dorsal view of fastigium.
- Fig. 272.—*Praxibulus carnei* n. sp. Female (allotype). Mt. Buffalo, Vic. Lateral view of fastigium.
- Fig. 273.—*Praxibulus carnei* n. sp. Female (allotype). Mt. Buffalo, Vic. Ventral view of apex of abdomen.
- Fig. 274.—*Praxibulus nexilis* n. sp. Female (allotype). Eleven miles NW. of Kingston, N.S.W. Dorsal view of fastigium.
- Fig. 275.—*Praxibulus nexilis* n. sp. Female (allotype). Eleven miles NW. of Kingston, N.S.W. Lateral view of fastigium.
- Fig. 276.—*Praxibulus nexilis* n. sp. Female (allotype). Eleven miles NW. of Kingston, N.S.W. Ventral view of apex of abdomen.
- Fig. 277.—*Praxibulus nexilis* n. sp. Male. Two miles NW. of Cobbadah, N.S.W. Proximal crest of supra-anal plate as seen in cephalic aspect (variant type).
- Fig. 278.—*Praxibulus galeritus* n. sp. Male (type). Five miles E. of Kangaroo Valley, N.S.W. Dorsal view of apex of abdomen.
- Fig. 279.—*Praxibulus galeritus* n. sp. Male (type). Five miles E. of Kangaroo Valley, N.S.W. Lateral view of apex of abdomen.
- Fig. 280.—*Praxibulus galeritus* n. sp. Male. Dee Why, N.S.W. Proximal crest of supra-anal plate as seen in cephalic aspect.

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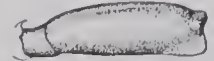
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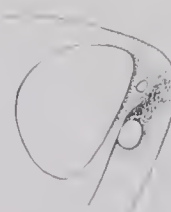
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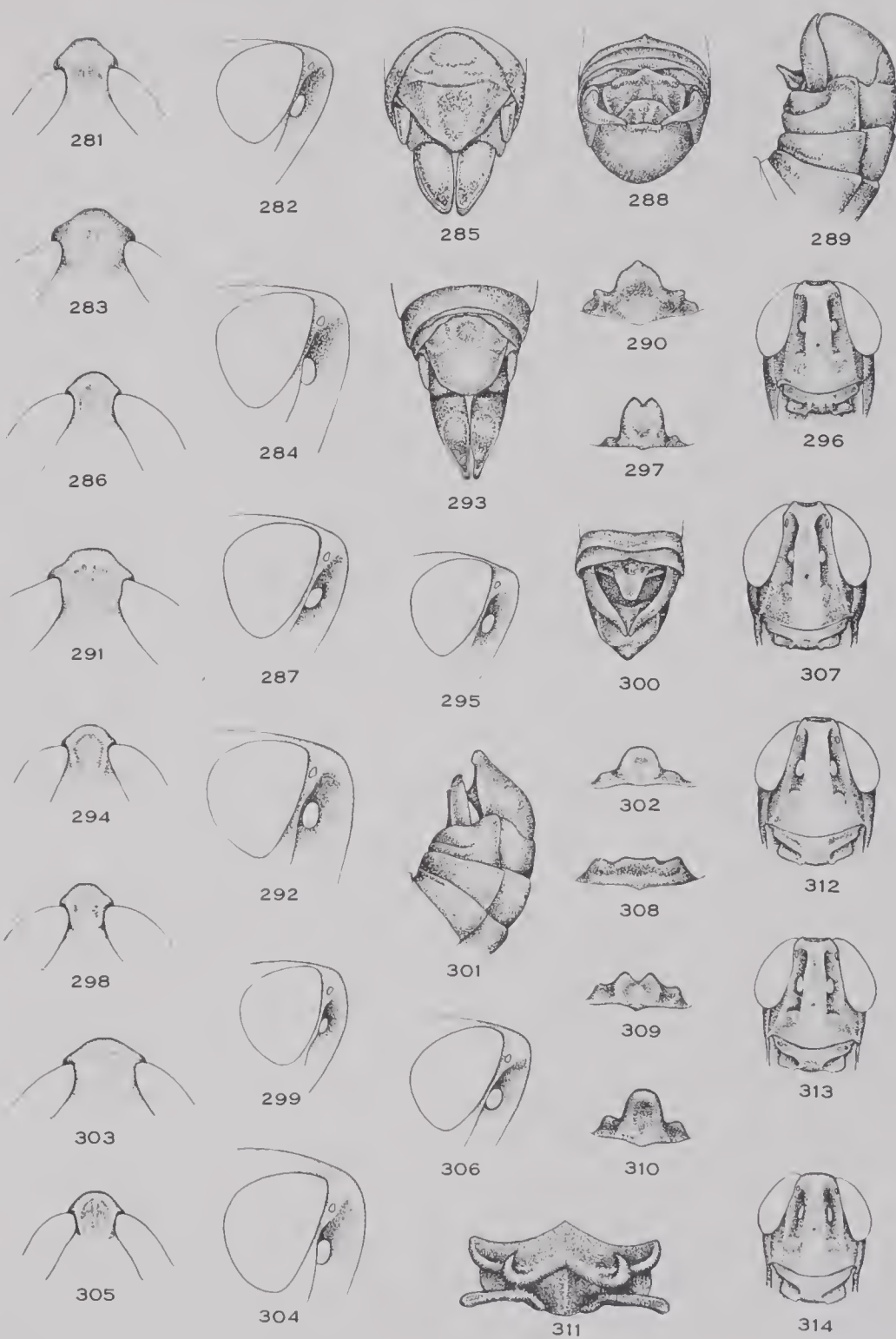
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- Fig. 281.—*Praxibulus galeritus* n. sp. Male (type). Five miles E. of Kangaroo Valley, N.S.W. Dorsal view of lastigium.
- Fig. 282.—*Praxibulus galeritus* n. sp. Male (type). Five miles E. of Kangaroo Valley, N.S.W. Lateral view of lastigium.
- Fig. 283.—*Praxibulus galeritus* n. sp. Female (allotype). Five miles E. of Kangaroo Valley, N.S.W. Dorsal view of lastigium.
- Fig. 284.—*Praxibulus galeritus* n. sp. Female (allotype). Five miles E. of Kangaroo Valley, N.S.W. Lateral view of lastigium.
- Fig. 285.—*Praxibulus galeritus* n. sp. Female (allotype). Five miles E. of Kangaroo Valley, N.S.W. Dorsal view of apex of abdomen.
- Fig. 286.—*Praxibulus triangularis* n. sp. Male (type). One mile N. of Polbluc, N.S.W. Dorsal view of fastigium.
- Fig. 287.—*Praxibulus triangularis* n. sp. Male (type). One mile N. of Polbluc, N.S.W. Lateral view of fastigium.
- Fig. 288.—*Praxibulus triangularis* n. sp. Male (type). One mile N. of Polbluc, N.S.W. Dorsal view of apex of abdomen.
- Fig. 289.—*Praxibulus triangularis* n. sp. Male (type). One mile N. of Polbluc, N.S.W. Lateral view of apex of abdomen.
- Fig. 290.—*Praxibulus triangularis* n. sp. Male. One mile ESE. of Hantley, N.S.W. Proximal crest of supra-anal plate as seen in cephalic aspect.
- Fig. 291.—*Praxibulus triangularis* n. sp. Female (allotype). Three miles ESE. of Wharton's Mill, N.S.W. Dorsal view of fastigium.
- Fig. 292.—*Praxibulus triangularis* n. sp. Female (allotype). Three miles ESE. of Wharton's Mill, N.S.W. Lateral view of fastigium.
- Fig. 293.—*Praxibulus triangularis* n. sp. Female (allotype). Three miles ESE. of Wharton's Mill, N.S.W. Dorsal view of apex of abdomen.
- Fig. 294.—*Praxibulus duplex* n. sp. Male (type). One mile S. of Gormandale, Vic. Dorsal view of fastigium.
- Fig. 295.—*Praxibulus duplex* n. sp. Male (type). One mile S. of Gormandale, Vic. Lateral view of fastigium.
- Fig. 296.—*Praxibulus duplex* n. sp. Male (type). One mile S. of Gormandale, Vic. Cephalic view of head.
- Fig. 297.—*Praxibulus duplex* n. sp. Male (type). One mile S. of Gormandale, Vic. Proximal crest of supra-anal plate as seen in cephalic aspect.
- Fig. 298.—*Praxibulus laminatus ulnaris* Sjöstedt. Male. Two miles E. of Nowa Nowa, Vic. Dorsal view of fastigium.
- Fig. 299.—*Praxibulus laminatus ulnaris* Sjöstedt. Male. Two miles E. of Nowa Nowa, Vic. Lateral view of fastigium.
- Fig. 300.—*Praxibulus laminatus ulnaris* Sjöstedt. Male. Two miles E. of Nowa Nowa, Vic. Dorsal view of apex of abdomen.
- Fig. 301.—*Praxibulus laminatus ulnaris* Sjöstedt. Male. Two miles E. of Nowa Nowa, Vic. Lateral view of apex of abdomen.
- Fig. 302.—*Praxibulus laminatus ulnaris* Sjöstedt. Male. Gibraltar Point, Vic. Proximal crest of supra-anal plate as seen in cephalic aspect.
- Fig. 303.—*Praxibulus laminatus ulnaris* Sjöstedt. Female. Alexandria, Vic. Dorsal view of lastigium.
- Fig. 304.—*Praxibulus laminatus ulnaris* Sjöstedt. Female. Alexandria, Vic. Lateral view of lastigium.
- Fig. 305.—*Praxibulus laminatus laminatus* (Stål). Male. One mile N. of Mittagong, N.S.W. Dorsal view of lastigium.
- Fig. 306.—*Praxibulus laminatus laminatus* (Stål). Male. One mile W. of Mittagong, N.S.W. Lateral view of lastigium.
- Fig. 307.—*Praxibulus laminatus laminatus* (Stål). Male. One mile W. of Mittagong, N.S.W. Cephalic view of head.
- Fig. 308.—*Praxibulus laminatus laminatus* (Stål). Male. One mile W. of Mittagong, N.S.W. Proximal crest of supra-anal plate as seen in cephalic aspect.
- Fig. 309.—*Praxibulus laminatus laminatus* (Stål). Male. Bookham, N.S.W. Proximal crest of supra-anal plate as seen in cephalic aspect.
- Fig. 310.—*Praxibulus laminatus laminatus* (Stål). Male. Seven miles NE. of Jingellic, N.S.W. Proximal crest of supra-anal plate as seen in cephalic aspect.
- Fig. 311.—*Praxibulus laminatus laminatus* (Stål). Male. Blundells, A.C.T. Epiphallus as seen from dorsum.
- Fig. 312.—*Praxibulus laminatus laminatus* (Stål). Female. One mile W. of Mittagong, N.S.W. Cephalic view of head.
- Fig. 313.—*Praxibulus laminatus actus* n. subsp. Male (type). Coolah to Cassilis, N.S.W. Cephalic view of head.
- Fig. 314.—*Praxibulus laminatus actus* n. subsp. Female (allotype). Coolah to Cassilis, N.S.W. Cephalic view of head.

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- Fig. 315.—*Praxibulus laminatus actus* n. subsp. Male (type). Coolah to Cassilis, N.S.W. Dorsal view of fastigium.
- Fig. 316.—*Praxibulus laminatus actus* n. subsp. Male (type). Coolah to Cassilis, N.S.W. Lateral view of head.
- Fig. 317.—*Praxibulus laminatus actus* n. subsp. Male (type). Coolah to Cassilis, N.S.W. Proximal crest of supra-anal plate as seen in cephalic aspect.
- Fig. 318.—*Praxibulus exsculptus* n. sp. Male (type). Hunter Springs Station, N.S.W. Proximal crest of supra-anal plate as seen in cephalic aspect.
- Fig. 319.—*Kosciuscola tristis tristis* Sjöstedt. Male. Mt. Kosciusko, N.S.W., 6850–7328 ft. Dorsal view of head.
- Fig. 320.—*Kosciuscola tristis tristis* Sjöstedt. Male. Mt. Kosciusko, N.S.W., 6850–7328 ft. Lateral view of head.
- Fig. 321.—*Kosciuscola tristis tristis* Sjöstedt. Male. Mt. Kosciusko, N.S.W., 6850–7328 ft. Cephalic view of head.
- Fig. 322.—*Kosciuscola tristis tristis* Sjöstedt. Male. Mt. Kosciusko, N.S.W., 6850–7328 ft. Prosternal process as seen in caudal view.
- Fig. 323.—*Kosciuscola tristis tristis* Sjöstedt. Male. Mt. Kosciusko, N.S.W., 6850–7328 ft. Dorsal view of apex of abdomen.
- Fig. 324.—*Kosciuscola tristis tristis* Sjöstedt. Male. Mt. Kosciusko, N.S.W., 6850–7328 ft. Lateral view of apex of abdomen.
- Fig. 325.—*Kosciuscola tristis tristis* Sjöstedt. Male. Mt. Kosciusko, N.S.W., summit (7300 ft). Caudal aspect of aedeagus.
- Fig. 326.—*Kosciuscola tristis tristis* Sjöstedt. Male. Mt. Kosciusko, N.S.W., summit (7300 ft). Epiphallus as seen from dorsum.
- Fig. 327.—*Kosciuscola tristis tristis* Sjöstedt. Male. Aberrant. The Chalet, Kosciusko Massif, N.S.W. Dorsal view of head.
- Fig. 328.—*Kosciuscola tristis tristis* Sjöstedt. Male. Aberrant. The Chalet, Kosciusko Massif, N.S.W. Lateral view of head.
- Fig. 329.—*Kosciuscola tristis tristis* Sjöstedt. Male. Aberrant. The Chalet, Kosciusko Massif, N.S.W. Dorsal view of apex of abdomen.
- Fig. 330.—*Kosciuscola tristis tristis* Sjöstedt. Female. Mt. Kosciusko, N.S.W., summit (7300 ft). Dorsal view of head.
- Fig. 331.—*Kosciuscola tristis tristis* Sjöstedt. Female. Mt. Kosciusko, N.S.W., summit (7300 ft). Lateral view of head.
- Fig. 332.—*Kosciuscola tristis tristis* Sjöstedt. Female. Mt. Kosciusko, N.S.W., summit (7300 ft). Cephalic view of head.
- Fig. 333.—*Kosciuscola tristis tristis* Sjöstedt. Female. Mt. Kosciusko, N.S.W., summit (7300 ft). Prosternal process as seen in caudal view.
- Fig. 334.—*Kosciuscola tristis tristis* Sjöstedt. Female. Mt. Kosciusko, N.S.W., summit (7300 ft). Dorsal view of apex of abdomen.
- Fig. 335.—*Kosciuscola tristis tristis* Sjöstedt. Female. Mt. Kosciusko, N.S.W., summit (7300 ft). Lateral view of apex of abdomen.
- Fig. 336.—*Kosciuscola tristis restrictus* n. subsp. Male (type). Mt. Bullalo, Vic., c. 5600 ft. Dorsal view of head.
- Fig. 337.—*Kosciuscola tristis restrictus* n. subsp. Male (type). Mt. Bullalo, Vic., c. 5600 ft. Lateral view of head.

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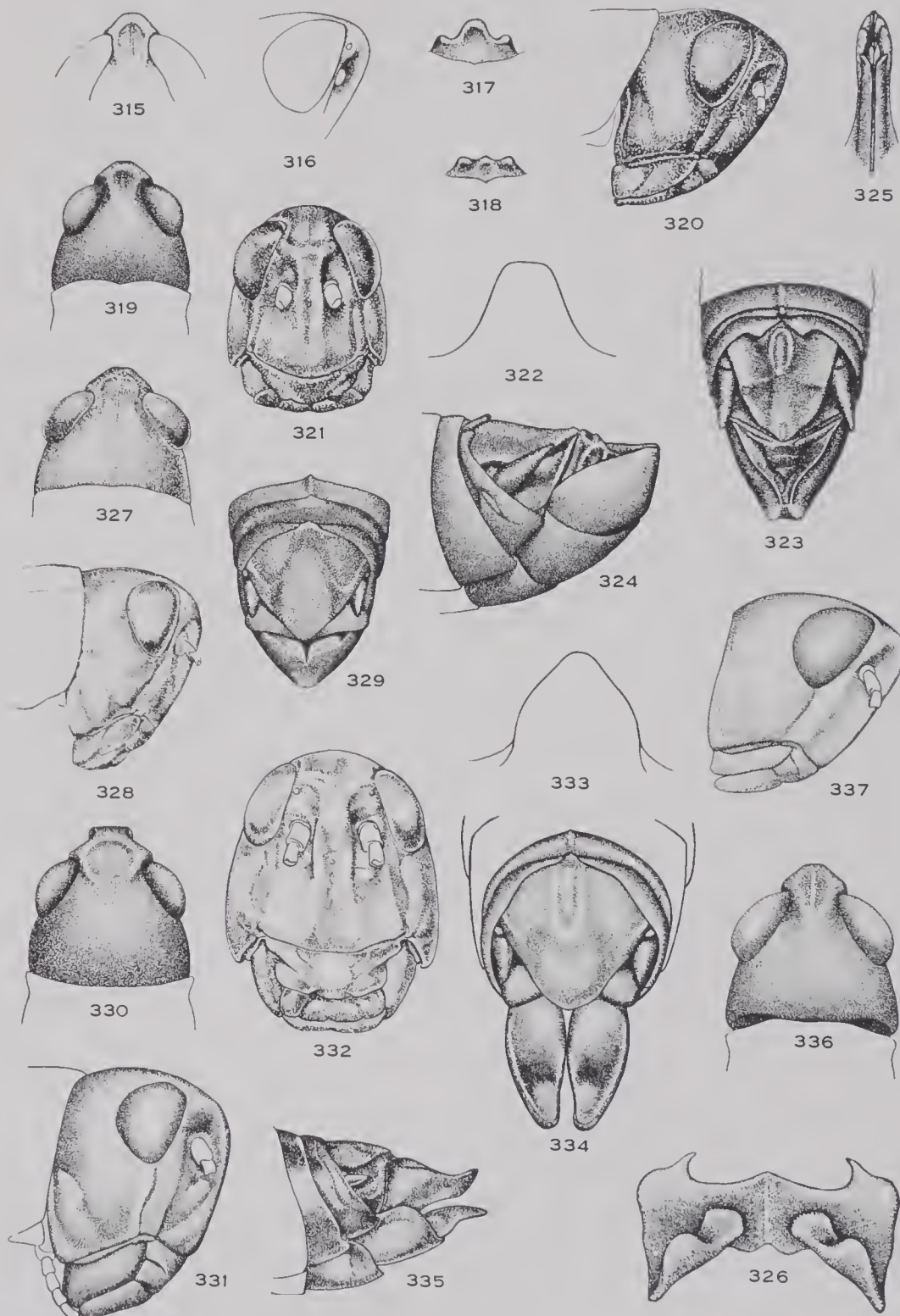
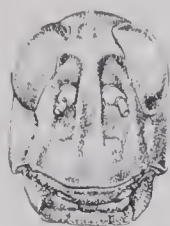


PLATE 26

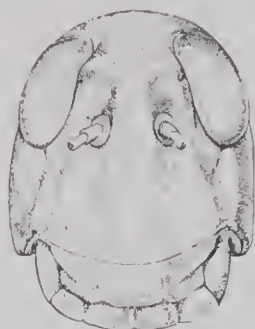
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- Fig. 338.—*Kosciuscola tristis restrictus* n. subsp. Male (type). Mt. Buffalo, Vic., c. 5600 ft. Cephalic view of head.
- Fig. 339.—*Kosciuscola tristis restrictus* n. subsp. Male (type). Mt. Buffalo, Vic., c. 5600 ft. Dorsal view of apex of abdomen.
- Fig. 340.—*Kosciuscola tristis restrictus* n. subsp. Male (type). Mt. Buffalo, Vic., c. 5600 ft. Lateral view of apex of abdomen.
- Fig. 341.—*Kosciuscola tristis restrictus* n. subsp. Female (allotype). Mt. Buffalo, Vic., c. 5600 ft. Dorsal view of head.
- Fig. 342.—*Kosciuscola tristis restrictus* n. subsp. Female (allotype). Mt. Buffalo, Vic., c. 5600 ft. Lateral view of head.
- Fig. 343.—*Kosciuscola tristis restrictus* n. subsp. Female (allotype). Mt. Buffalo, Vic., c. 5600 ft. Cephalic view of head.
- Fig. 344.—*Kosciuscola tristis restrictus* n. subsp. Female (allotype). Mt. Buffalo, Vic., c. 5600 ft. Dorsal view of apex of abdomen.
- Fig. 345.—*Kosciuscola tristis restrictus* n. subsp. Female (allotype). Mt. Buffalo, Vic., c. 5600 ft. Lateral view of apex of abdomen.
- Fig. 346.—*Kosciuscola cognatus* n. sp. Male (type). Mt. Gingera, A.C.T., 5510–6092 ft. Dorsal view of head.
- Fig. 347.—*Kosciuscola cognatus* n. sp. Male (type). Mt. Gingera, A.C.T., 5510–6092 ft. Lateral view of head.
- Fig. 348.—*Kosciuscola cognatus* n. sp. Male (type). Mt. Gingera, A.C.T., 5510–6092 ft. Cephalic view of head.
- Fig. 349.—*Kosciuscola cognatus* n. sp. Male (type). Mt. Gingera, A.C.T., 5510–6092 ft. Prosternal process as seen in caudal view.
- Fig. 350.—*Kosciuscola cognatus* n. sp. Male (type). Mt. Gingera, A.C.T., 5510–6092 ft. Dorsal view of apex of abdomen.
- Fig. 351.—*Kosciuscola cognatus* n. sp. Male (type). Mt. Gingera, A.C.T., 5510–6092 ft. Lateral view of apex of abdomen.
- Fig. 352.—*Kosciuscola cognatus* n. sp. Female (allotype). Mt. Gingera, A.C.T., 6092 ft. Dorsal view of head.
- Fig. 353.—*Kosciuscola cognatus* n. sp. Female (allotype). Mt. Gingera, A.C.T., 6092 ft. Lateral view of head.
- Fig. 354.—*Kosciuscola cognatus* n. sp. Female (allotype). Mt. Gingera, A.C.T., 6092 ft. Cephalic view of head.
- Fig. 355.—*Kosciuscola cognatus* n. sp. Female (allotype). Mt. Gingera, A.C.T., 6092 ft. Prosternal process as seen in caudal view.

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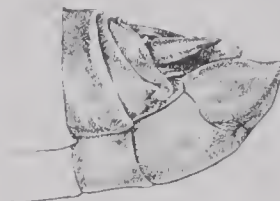
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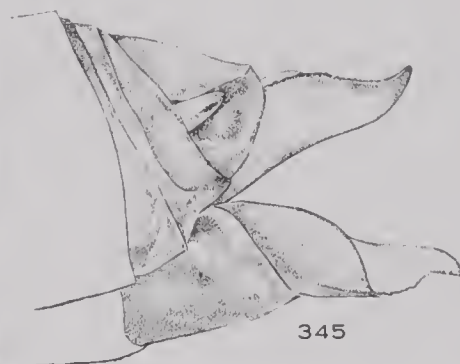
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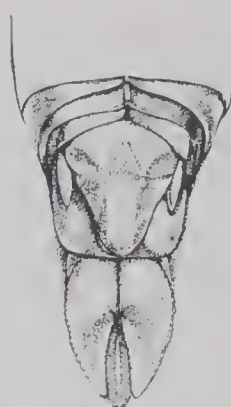
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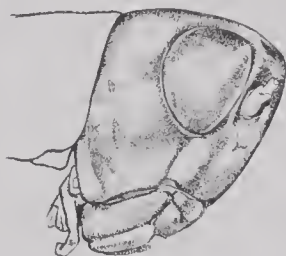
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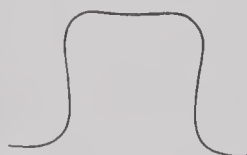
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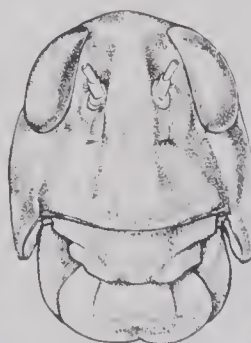
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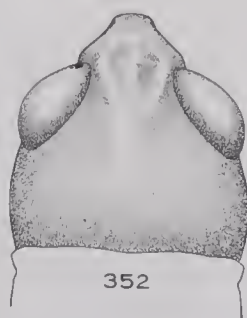
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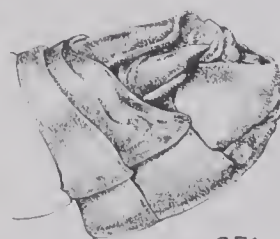
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PLATE 27

All enlarged

- Fig. 356.—*Kosciuscola cognatus* n.sp. Female (allotype). Mt. Gingera, A.C.T., 6092 ft. Dorsal view of apex of abdomen.
- Fig. 357.—*Kosciuscola cognatus* n.sp. Female (allotype). Mt. Gingera, A.C.T., 6092 ft. Lateral view of apex of abdomen.
- Fig. 358.—*Kosciuscola cognatus* n.sp. Female (allotype). Mt. Gingera, A.C.T., 6092 ft. Distal margin of subgenital plate.
- Fig. 359.—*Kosciuscola cognatus* n.sp. Male. Aberrant. Aggie-Franklin Saddle, A.C.T., 4600 ft. Dorsal view of head.
- Fig. 360.—*Kosciuscola cognatus* n.sp. Male. Aberrant. Aggie-Franklin Saddle, A.C.T., 4600 ft. Lateral view of head.
- Fig. 361.—*Kosciuscola cognatus* n.sp. Male. Aberrant. Aggie-Franklin Saddle, A.C.T., 4600 ft. Dorsal view of apex of abdomen.
- Fig. 362.—*Kosciuscola cognatus* n.sp. Male. Aberrant. Mt. Gingera, A.C.T., 6092 ft. Dorsal view of head.
- Fig. 363.—*Kosciuscola tasmanicus* n.sp. Male (type). Victoria Valley, Tasmania. Dorsal view of head.
- Fig. 364.—*Kosciuscola tasmanicus* n.sp. Male (type). Victoria Valley, Tasmania. Lateral view of head.
- Fig. 365.—*Kosciuscola tasmanicus* n.sp. Male (type). Victoria Valley, Tasmania. Cephalic view of head.
- Fig. 366.—*Kosciuscola tasmanicus* n.sp. Male (type). Victoria Valley, Tasmania. Prosternal process as seen in caudal view.
- Fig. 367.—*Kosciuscola tasmanicus* n.sp. Male (type). Victoria Valley, Tasmania. Dorsal view of apex of abdomen.
- Fig. 368.—*Kosciuscola tasmanicus* n.sp. Male (type). Victoria Valley, Tasmania. Lateral view of apex of abdomen.
- Fig. 369.—*Kosciuscola tasmanicus* n.sp. Female (allotype). Victoria Valley, Tasmania. Dorsal view of head.
- Fig. 370.—*Kosciuscola tasmanicus* n.sp. Female (allotype). Victoria Valley, Tasmania. Lateral view of head.
- Fig. 371.—*Kosciuscola tasmanicus* n.sp. Female (allotype). Victoria Valley, Tasmania. Cephalic view of head.
- Fig. 372.—*Kosciuscola tasmanicus* n.sp. Female (allotype). Victoria Valley, Tasmania. Prosternal process as seen in caudal view.
- Fig. 373.—*Kosciuscola tasmanicus* n.sp. Female (allotype). Victoria Valley, Tasmania. Dorsal view of apex of abdomen.
- Fig. 374.—*Kosciuscola tasmanicus* n.sp. Female (allotype). Victoria Valley, Tasmania. Lateral view of apex of abdomen.
- Fig. 375.—*Kosciuscola tasmanicus* n.sp. Female (allotype). Victoria Valley, Tasmania. Ventral view of apex of subgenital plate.

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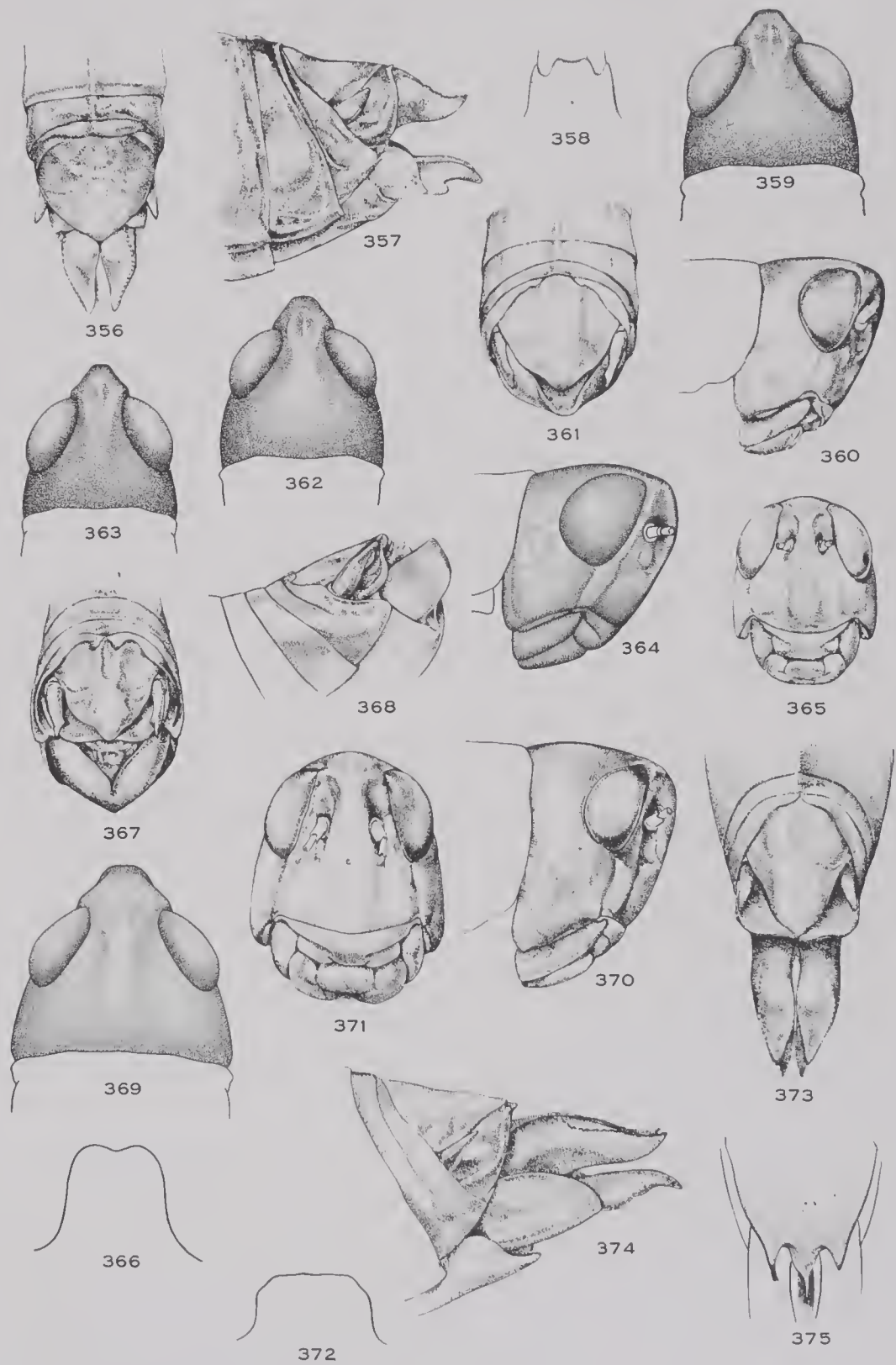
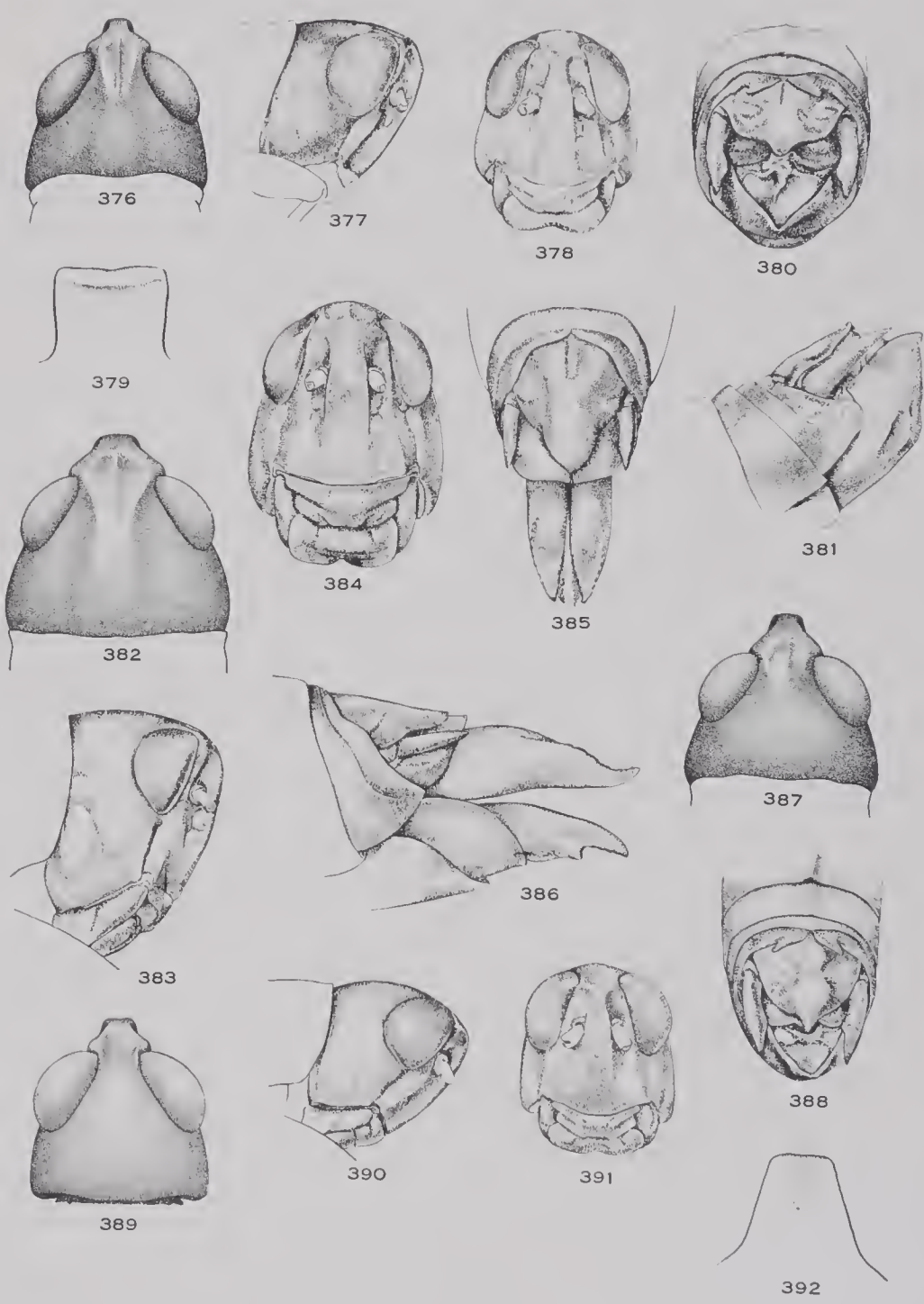


PLATE 28

All enlarged

- Fig. 376.—*Kosciuscola usitatus* n. sp. Male (type). Mt. Gingera, A.C.T., 6092 ft. Dorsal view of head.
- Fig. 377.—*Kosciuscola usitatus* n. sp. Male (type). Mt. Gingera, A.C.T., 6092 ft. Lateral view of head.
- Fig. 378.—*Kosciuscola usitatus* n. sp. Male (type). Mt. Gingera, A.C.T., 6092 ft. Cephalic view of head.
- Fig. 379.—*Kosciuscola usitatus* n. sp. Male (type). Mt. Gingera, A.C.T., 6092 ft. Prosternal process as seen in caudal view.
- Fig. 380.—*Kosciuscola usitatus* n. sp. Male (type). Mt. Gingera, A.C.T., 6092 ft. Dorsal view of apex of abdomen.
- Fig. 381.—*Kosciuscola usitatus* n. sp. Male (type). Mt. Gingera, A.C.T., 6092 ft. Lateral view of apex of abdomen.
- Fig. 382.—*Kosciuscola usitatus* n. sp. Female (allotype). Mt. Gingera, A.C.T., 6092 ft. Dorsal view of head.
- Fig. 383.—*Kosciuscola usitatus* n. sp. Female (allotype). Mt. Gingera, A.C.T., 6092 ft. Lateral view of head.
- Fig. 384.—*Kosciuscola usitatus* n. sp. Female (allotype). Mt. Gingera, A.C.T., 6092 ft. Cephalic view of head.
- Fig. 385.—*Kosciuscola usitatus* n. sp. Female (allotype). Mt. Gingera, A.C.T., 6092 ft. Dorsal view of apex of abdomen.
- Fig. 386.—*Kosciuscola usitatus* n. sp. Female (allotype). Mt. Gingera, A.C.T., 6092 ft. Lateral view of apex of abdomen.
- Fig. 387.—*Kosciuscola usitatus* n. sp. Male. Aberrant. Mt. Gingera, A.C.T., 6092 ft. Dorsal view of head.
- Fig. 388.—*Kosciuscola usitatus* n. sp. Male. Aberrant. Mt. Gingera, A.C.T., 6092 ft. Dorsal view of apex of abdomen.
- Fig. 389.—*Kosciuscola cuneatus* n. sp. Male (type). Lee's Spring, A.C.T. Dorsal view of head.
- Fig. 390.—*Kosciuscola cuneatus* n. sp. Male (type). Lee's Spring, A.C.T. Lateral view of head.
- Fig. 391.—*Kosciuscola cuneatus* n. sp. Male (type). Lee's Spring, A.C.T. Cephalic view of head.
- Fig. 392.—*Kosciuscola cuneatus* n. sp. Male (type). Lee's Spring, A.C.T. Prosternal process as seen in caudal aspect.

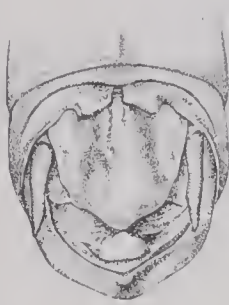
GRASSHOPPERS AND LOCUSTS OF AUSTRALIA



All enlarged

- Fig. 393.—*Kosciuscola cuneatus* n. sp. Male (type). Lee's Spring, A.C.T. Dorsal view of apex of abdomen.
- Fig. 394.—*Kosciuscola cuneatus* n. sp. Male (type). Lee's Spring, A.C.T. Lateral view of apex of abdomen.
- Fig. 395.—*Kosciuscola cuneatus* n. sp. Male (type). Lee's Spring, A.C.T. Caudal aspect of subgenital plate.
- Fig. 396.—*Kosciuscola cuneatus* n. sp. Male. Aberrant. Bull's Head, A.C.T., c. 1325 ft. Dorsal view of apex of abdomen.
- Fig. 397.—*Kosciuscola cuneatus* n. sp. Female (allotype). Lee's Spring, A.C.T. Dorsal view of head.
- Fig. 398.—*Kosciuscola cuneatus* n. sp. Female (allotype). Lee's Spring, A.C.T. Lateral view of head.
- Fig. 399.—*Kosciuscola cuneatus* n. sp. Female (allotype). Lee's Spring, A.C.T. Cephalic view of head.
- Fig. 400.—*Kosciuscola cuneatus* n. sp. Female (allotype). Lee's Spring, A.C.T. Prosternal process as seen in caudal aspect.
- Fig. 401.—*Kosciuscola cuneatus* n. sp. Female (allotype). Lee's Spring, A.C.T. Dorsal view of apex of abdomen.
- Fig. 402.—*Kosciuscola cuneatus* n. sp. Female (allotype). Lee's Spring, A.C.T. Lateral view of apex of abdomen.

GRASSHOPPERS AND LOCUSTS OF AUSTRALIA



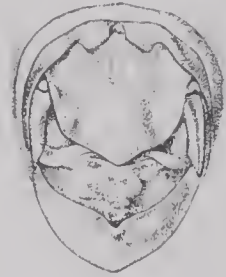
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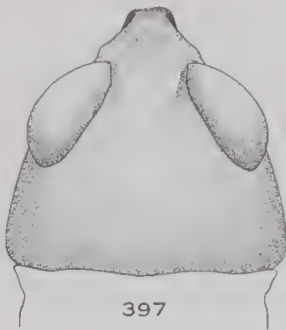
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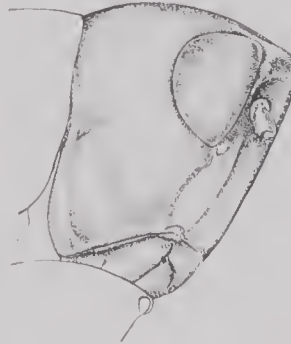
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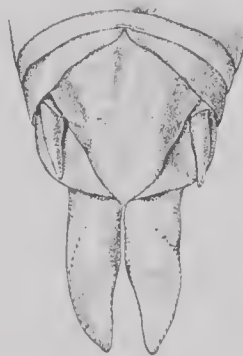
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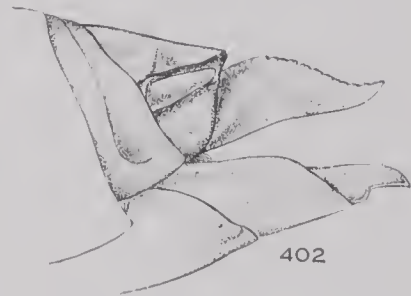
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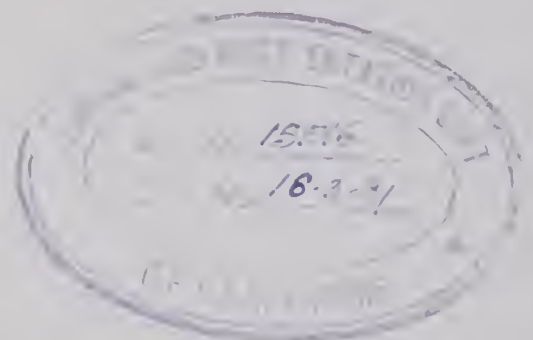
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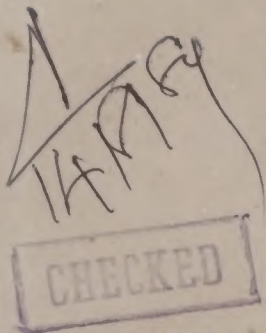


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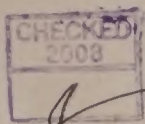


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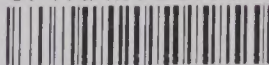




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